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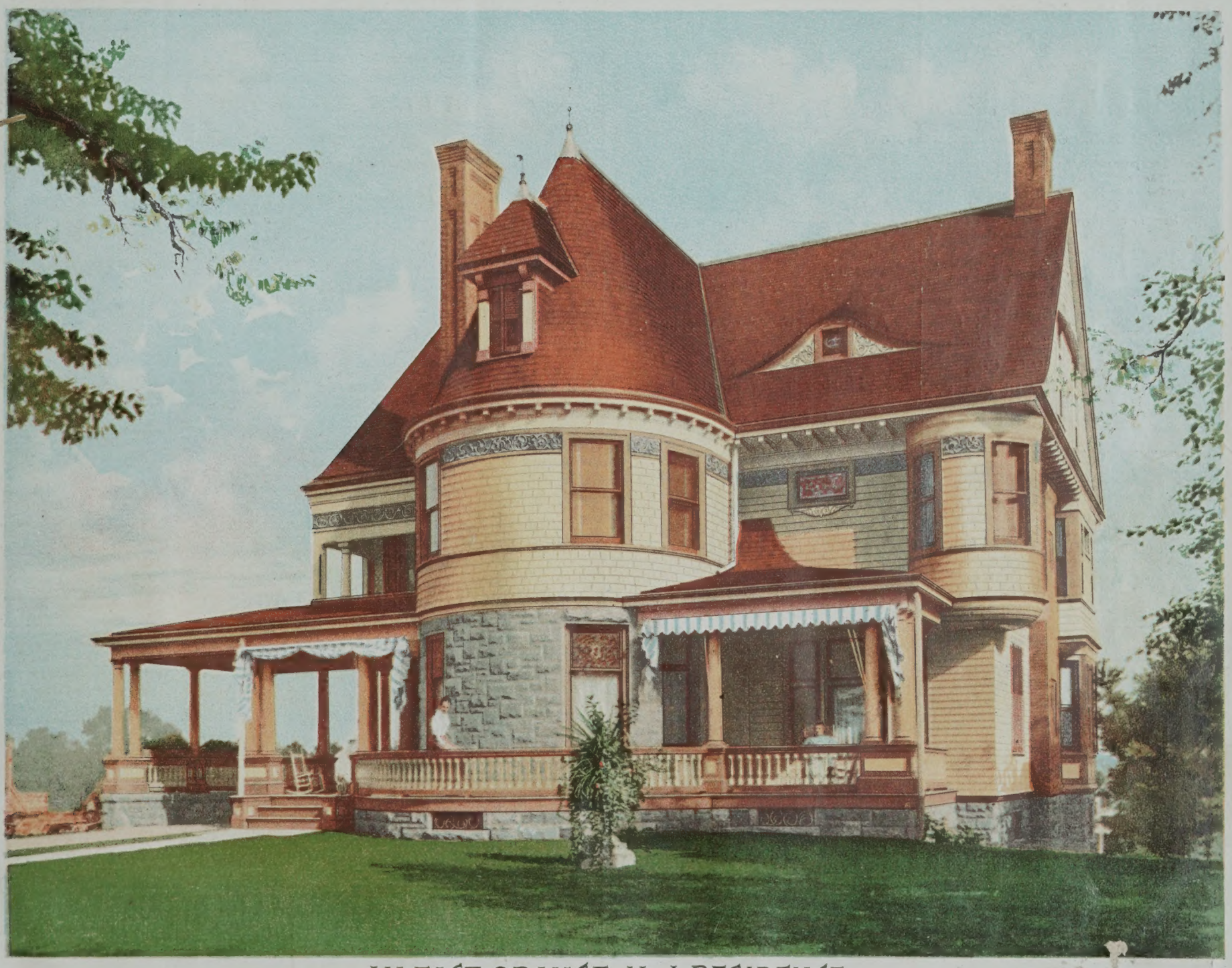

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No 122. DECEMBER 1895.

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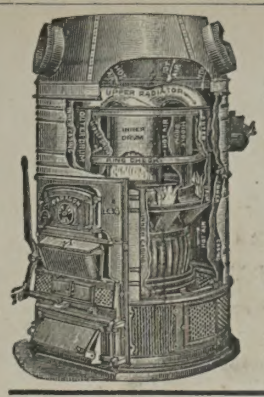

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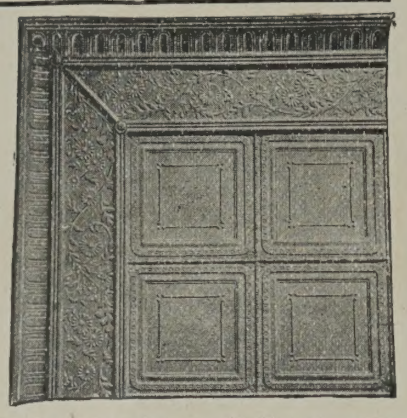

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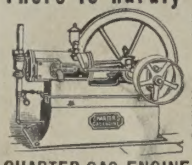

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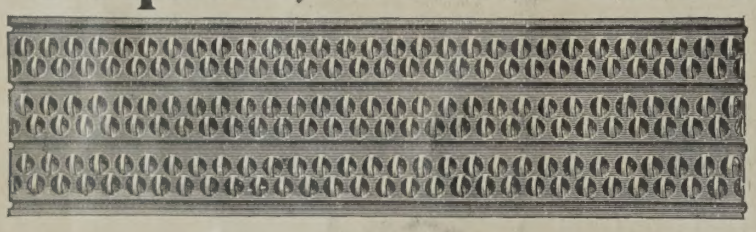

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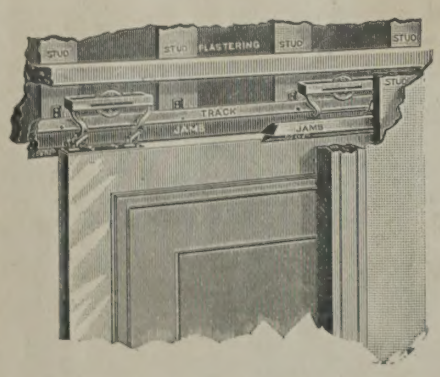

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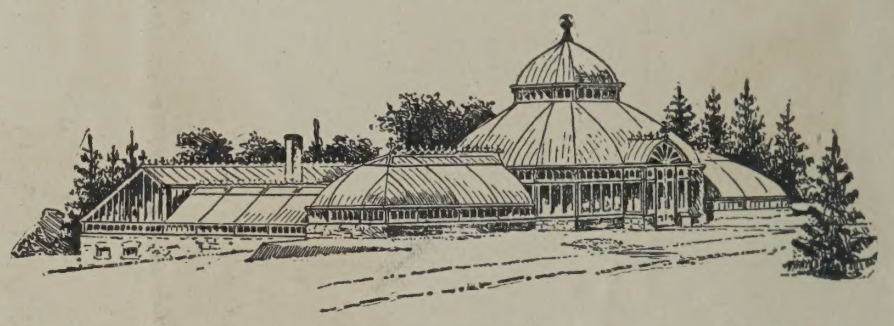

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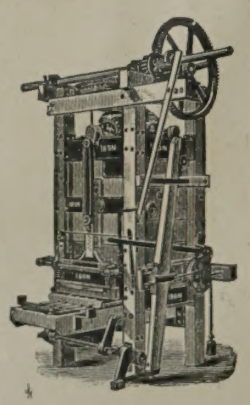

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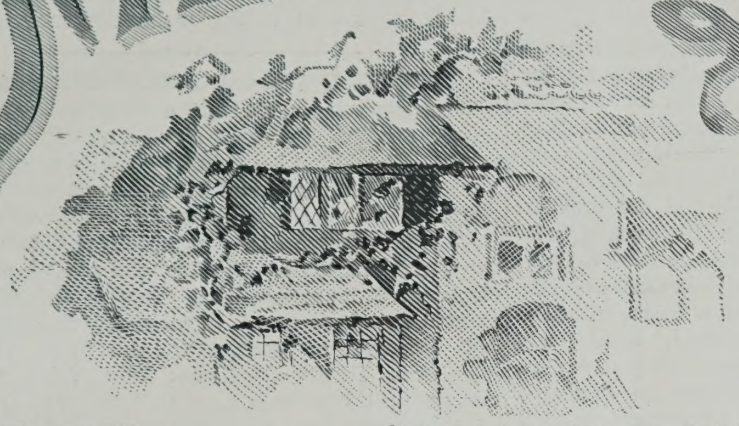

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ESTABLISHED 1884. [Entered at the Post Office of New York, N. Y., as Second Class matter. Copyright, 1895, by Munn & Co.] PUBLISHED MONTHLY.

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THE HOTEL MAJESTIC, NEW YORK.—See page 3.

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SCIENTIFIC AMERICAN, BUILDING EDITION.

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A RESIDENCE AT GLENWOOD, N. Y.

We present on pages 4 and 6 a residence which has been recently erected for William R. Innis, Esq., at Glenwood, N. Y. The perspectives present an attractive looking building, while the plans show large rooms, arranged in a convenient manner. The foundation is of stone, the underpinning of brick, and the superstructure of wood. The first story is clapboarded, and the second and third stories are shingled. It is painted Colonial yellow, with white trimmings. The roof is shingled, and painted red. Dimensions: Front, 53 ft.; side, 60 ft., not including piazza. Height of ceilings: Cellar, 8 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. The vestibule has a mosaic tiled floor. The hall is trimmed with oak. It has a floor of oak, paneled wainscoting, divan, and an ornamental staircase, with carved newel posts. A balcony is thrown out at the second landing, with windows running down to floor. The toilet is conveniently located. The parlor, music room, library and dining-room are trimmed with oak, and are provided with oak floors, highly polished. The fireplaces in parlor and library have Mexican onyx facings, tiled hearths, and massive carved mantels, with mirrors and columns. The fireplace in dining-room is built of brick, with tiled facings and hearth, and a similar mantel. Kitchen and pantries are wainscoted, and trimmed with yellow pine, and finished natural. These apartments are furnished with the usual fixtures complete. The second floor is trimmed with whitewood, and finished natural. It contains five bedrooms, large closets, dressing-room and bathroom, the latter wainscoted, and fitted up with exposed plumbing. The fireplaces on this floor are furnished complete. The third floor contains two bedrooms and two trunk rooms. Cemented cellar contains laundry, furnace, and other necessary apartments.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT NEW ROCHELLE, N. Y.

On page 7 we publish an engraving and floor plans, showing an attractive example for a modern cottage house, recently erected by Charles O. Le Count, Esq., at Le Count Place, New Rochelle, N. Y. The design comprises a cottage house of the American order of architecture, with its lines well broken, the whole crowned by a graceful roof running down and forming a cover for porch. The underpinning is built of rock-faced stone, laid up in a neat manner. The superstructure, of wood, is covered with shingles, and painted silver gray, with white trimmings. The roof is shingled, and stained moss green. Dimensions: Front, 24 ft. 6 in.; side, 41 ft. 6 in., not including porch. Height of ceilings: Cellar, 7 ft.; first story, 9 ft; second, 8 ft. 6 in. The interior throughout is trimmed with whitewood, and is finished natural. The doors and windows have beaded casings and mouldings. The large hall, which is used as a reception room, is provided with an ornamental staircase, with a broad, low rise, and newel posts extending to ceiling, with spindle balusters and rail. It is lighted by a stained glass window with good effect. The parlor and dining-room each have large, open fireplaces, built of brick, and furnished with tiled hearths and facings, and hardwood mantels. Kitchen is wainscoted with narrow beaded stuff, and is provided with range, sink, wash trays, dresser, large pantry, and lobby large enough to admit ice box. The second floor contains four bedrooms and bathroom. The bedrooms have large, well fitted up closets, and the bathroom is wainscoted and fitted up with the usual fixtures. Third floor contains one bedroom and ample storage. Cemented cellar contains furnace and other apartments. Estimated cost, $3,000. This building was designed in 1890 by C. B. J. Snyder, architect, New York.

Our engraving was made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A SUMMER COTTAGE AT GREAT DIAMOND ISLAND, ME.

We publish on pages 5 and 6 a summer cottage, which has been recently erected for Edward L. Goding, Esq., at Great Diamond Island, Maine. The design presents a very picturesque exterior, with several features that give the building an artistic effect. The spacious and well shaded piazza, balconies, chimney and tower are some of the features. The cellar is excavated, and the building is supported on cedar posts with stone foundations. It is inclosed with latticed work, and it has an inside and outside entrance thereto. The first story is clapboarded, while the second and third stories are shingled. It is painted a silver gray. The columns at front piazza are finished natural with hard oil. Roof shingled, and painted red. Dimensions: Front, 33 ft.; side, 45 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in. The interior throughout is trimmed with white pine, stained and finished in cherry. The walls of the principal apartments have matting wainscoting, and the space above and ceiling are covered with burlap, put on with mouldings and brass nails. The effect is pleasing, and it gives a cool tone to the interior. The entrance hall, separated by an arch way with spindle transom, is provided with stairway, with turned newel posts and balusters. The living room is furnished with a paneled divan, and a large, open fireplace built of brick, with hearth and facings of same, and a neat wood mantel. Dining-room is well lighted and ventilated. It has a large closet for china, and a pantry with cupboards, and dressers. Kitchen is ceiled up with narrow beaded stuff, and fitted up with the usual necessary fixtures. The second floor contains five bedrooms, large closets, and bath, the latter wainscoted and provided with the necessary fixtures. Third floor contains storage. The floors are laid with yellow pine. Cost $2,500 complete. Mr. A. Dorticos, architect, Portland, Me.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT OAKWOOD, STATEN ISLAND.

We present on pages 8 and 9 a dwelling which has been erected for Mrs. Margaret Dutche, at Oakwood, Staten Island. The design has several good features, including a well shaded piazza and balcony, and excellent floor plans. The underpinning is built of brick, and the stonework, where shown in the perspectives, is built of rock-faced red sandstone. The first and second stories are clapboarded, and the third story is shingled. It is painted dark Indian red. Roof shingled, and painted red. Dimensions: Front, 40 ft.; side, 32 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior is trimmed throughout with whitewood, finished natural. The hall contains an ornamental staircase, turned out of ash. The open fireplace is built of brick, with hearth and facings of same, and a neat, ornamental wood mantel. Parlor, library and dining-room have similar cabinet mantels, with false fireplaces. Kitchen and pantries are wainscoted with narrow beaded stuff, and are fitted up with the usual fixtures. The second floor contains four bedrooms, den and bathroom, the latter wainscoted and fitted up replete. The third floor contains two bedrooms and ample storage. Cemented cellar contains furnace and other necessary apartments. Cost $3,800 complete. Mr. Herman Fritz, Jr., architect, Passaic, N. J.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT SPRINGFIELD, MASS.

The engravings and floor plans on pages 9 and 10 present a Colonial house which has been erected for Messrs. J. D. and W. H. McKnight, at Springfield, Mass. The design shows many pleasing bits of detail, while the floor plans present a most excellent interior arrangement, handsomely finished, and furnished with the best modern improvements. It has a foundation of stone, with an underpinning of brick. The building above, of wood, is covered on the exterior with matched sheathing and shingles, and is painted a slate color, with white trimmings. Roof shingled. Dimensions: Front, 32 ft.; side, 41 ft. 6 in., not including piazza and porch. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. Vestibule is paneled with oak, and provided with a tiled floor, and hall is trimmed with quartered oak. It has a paneled wainscoting, a nook containing a paneled divan, with bookcases built in on either side, an open fireplace built of Tiffany brick and furnished with a tiled hearth, and a hardwood mantel with columns and mirror, and staircase. This staircase is furnished with columns extending to ceiling, between which are placed carved brackets, forming an arcaded effect. The second landing is provided with a bay window, thrown out, and glazed with small panes of glass. Parlor and dining room are trimmed with sycamore, the former having an open fireplace with tiled trimmings and mantel, while the latter has a hardwood floor and buffet china cabinets built in on either side of bay window. Kitchen and pantries are trimmed and wainscoted with yellow pine, and finished natural. These apartments contain all the necessary fixtures of the best improvement. Second floor is trimmed with ash, and it contains four bedrooms and bathroom, and the third floor contains three bedrooms and trunk room. Bathroom is wainscoted and provided with the usual fixtures. Cemented cellar contains furnace, laundry, and other necessary apartments. Cost $6,000 complete. Mr. G. Wood Taylor, architect, Boston, Mass.

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A HOUSE IN THE COLONIAL STYLE.

We illustrate on page 11 a Colonial house, recently erected at Groton, Mass., in the style of Longfellow's home. The main features of this house are its simplicity of shape and the Corinthian decorations. It contains a central hall, with staircase at rear, and a large dining-room, running clear through the house, at one side of this hall, and two rooms on the other side. The wing is entirely devoted to the kitchen, laundry and servants' rooms; and it will be noticed on the elevations that the windows of the servants' rooms and the kitchen and laundry are placed so high that the front lawn is thus out of sight from those rooms, and, consequently, private. This house was built from the plans of Child & De Goll, architects, 62 New Street, New York.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

Hoop Poles.

It will not do to cut hoop poles when the sap is up, says the Wood Worker. The bark slips off, and you can't put it on the barrel to stay on, as the moment you strike it with a driver the bark slips and comes off, leaving nothing but the wood to hold it, and the wood has little or no strength if the bark is gone. The hoop then breaks off, and must be replaced with another hoop. Another difficulty with a pole after the sap is up is the fly stings the egg into it in hundreds of places, whereas, if it's a winter-cut pole, the bark hardens, and there is no sap to ferment and cause rapid breeding of worms. On this subject it is noteworthy, perhaps, to mention this peculiar feature of the work of the worm in hoop poles. It is easy to tell there are worms in poles by the presence of dust that resembles fine sawdust, especially where the poles are kept under shelter, as rain will wash the dust away when they are left outside or in open air.

How to drive Rats away Alive.

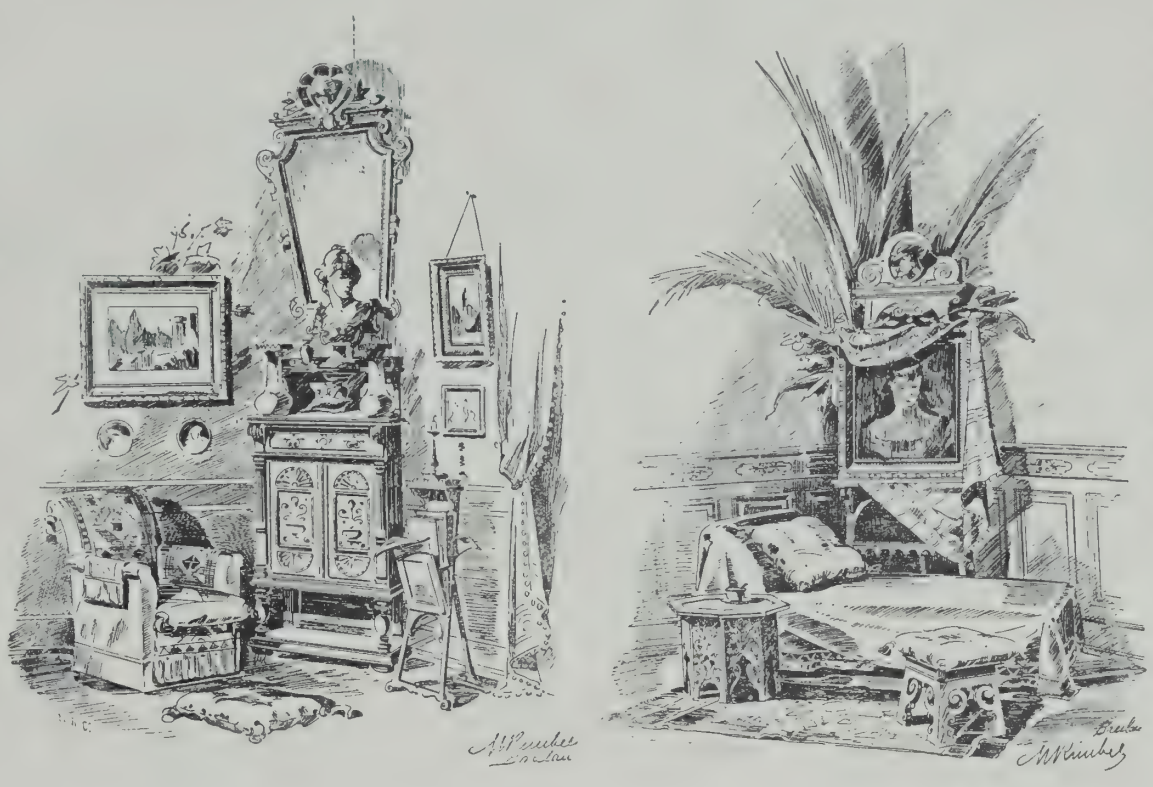
Somebody who has tried it recommends putting pulverized potash, which soon becomes sticky when exposed to the air, in all the rat holes about the house. The special detestation of a rat is anything which will stick to his silky coat. Some persons find a mixture of equal parts of Cayenne pepper and Scotch snuff sprinkled well into the holes still more efficacious.

A PLUMB-LINE suspended a few feet from the side of a large building inclines a little from the perpendicular, because the weight is attracted by the edifice.

A DWELLING AT BRIDGEPORT, CONN.

We present on pages 12 and 13 a residence recently erected for Christian M. Newman, Esq., at Bridgeport, Connecticut. It has many good features, including the spacious and well shaded piazza and the chimney breast. The underpinning is built of local bluestone and brick. The first story is clapboarded, while the second and third stories are shingled. It is painted slate color, with cream trimmings. The roof is shingled, and stained moss green, with excellent effect. Dimensions: Front, 30 ft.; side, 44 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior is trimmed with whitewood. The hall is finished in cherry. It has a paneled divan and an ornamental staircase, with carved newels, candelabra, and spindle-work. Parlor and library are finished in oak, the former having a chimney breast, with mantel made from special design. Library contains a nook for bookcase, window seat, and an open fireplace built of brick, and furnished with tiled facings and hearth, and a mantel of oak. Dining-room has a paneled wainscoting, a hardwood floor, and a nook for buffet. Kitchen and pantries are trimmed and wainscoted with whitewood, and are furnished with the usual fixtures complete. The second and third floors are finished natural, with hard oil. The second floor contains three bedrooms, large closets, and bathroom, while the third floor contains two bedrooms and trunk room. Bathroom is wainscoted with ash. It is fitted up with the usual fixtures, with exposed plumbing. Cemented cellar contains furnace, laundry, and other apartments. Mr. Samuel D. P. Williams, architect, Williamsburg, N. Y. Cost $5,000 complete.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.



SUGGESTIONS IN CORNER DECORATIONS.—From Moderne Innen Decoration.

THE HOTEL MAJESTIC, NEW YORK.

New York possesses some of the finest hotels in the world, and to the Waldorf, the New Netherlands, the Savoy, the Holland, the Imperial and the Plaza has recently been added the palatial hotel on Central Park West, between Seventy-first and Seventy-second Streets, the Hotel Majestic, of which we give a photographic view on our first page.

The structure is 150 by 204 feet, and the height of the twelve stories is 165 feet. The building, a modified Renaissance structure, is made fireproof, and contains 600 apartments. An open exposed court, 40 feet wide, gives abundant light and air to all the rooms not fronting on the street. Nearly four million dollars were spent in the erection and furnishing of this hotel. The architect was Mr. Jacob Rothschild, who was assisted by Messrs. Reeves and Livingston.

Some of the special features of the hotel deserve attention. A covered driveway for carriages runs entirely through the hotel. The main entrance and foyer are marvels of beauty, being richly decorated in Renaissance designs. The grand salon is furnished in the style of Louis XIV., the dining-room in the Empire style of decoration, etc. A spacious winter garden gives the effect of a conservatory. A novel feature is the arrangement of the musicians' gallery, it being so constructed that the orchestra, which plays nightly, may be enjoyed by those in the main dining-room, music room, grand assembly, and promenade halls at the same time. In summer the roof garden, occupying a surface area of thirty thousand square feet, offers the guests and their friends a nightly promenade concert, and by day an unobstructed view of the city, the Hudson and the Palisades, while at the door is the Park. The Hotel Majestic is in one of the choicest residence districts of the city. It fronts directly upon and overlooks the Central Park, with its lakes, trees, greenswards, flowers, winding paths, and driveways. The views from the Majestic are wonderful and enchanting.

Correction.

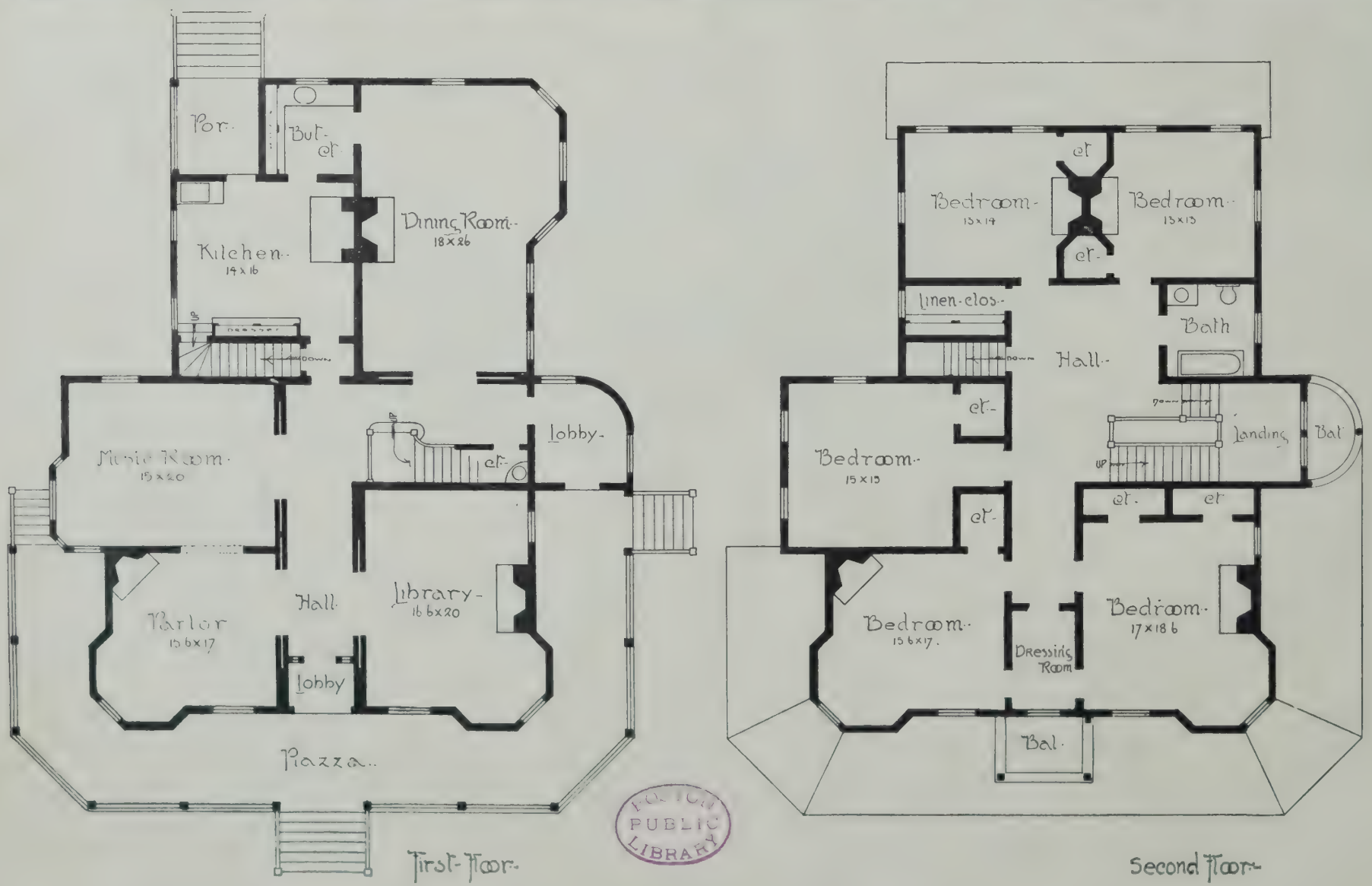
MR. BRADFORD L. GILBERT, New York, desires us to state that he was the architect of the residence at Montclair, N. J., built for Charles N. Marvin, Esq., described on page 39 of our number for March last. The mention of another name as the architect was an error.

"GRAYWOOD," A COTTAGE AT KENNEBUNKPORT, ME.

We present on page 14, "Graywood," the summer home of Margaret Deland, recently erected at Kennebunkport, Maine. The building is treated in the Colonial style, and it shows a picturesque perspective, combined with a well arranged plan. The building is erected on cedar posts, with stone footings. The exterior framework, of wood, is shingled on the exterior, and stained a silvery gray color, while the trimmings are painted white. Blinds are painted bottle green. Roof shingled and stained same as other work. Dimensions: Front, 52 ft. 6 in.; side, 28 ft., not including porches. Height of ceilings: First story, 9 ft. 6 in.; second, 9 ft. The interior is trimmed with whitewood, and painted China white. The lobby entrance is paneled. The living-room, which is the principal apartment, is located so as to face the ocean. It has a ribbed ceiling, and is provided with paneled divans, and a large, open fireplace built of brick, with facings and hearth of same, and a Colonial mantel made from special design. Dining-room is well ventilated, and thereby a cool room in summer. It contains entrance to staircase, which rises to second floor. This stairway is separated by a column extending to ceiling, and the space between filled in with ornamental spindles. Kitchen and its apartments are fitted up complete, and conveniently located. The second story contains five large bedrooms, and the third floor contains ample storage. Mr. Henry Paston Clark, architect, Studio Building Boston, Mass.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

IN the State of Washington the cheaper 16-inch red cedar shingles are so sawed that six butts measure two inches in thickness. In a higher cost shingle five butts measure two inches. In the cheaper 18-inch cedar shingles, five butts measure two inches, while in a slightly higher cost variety, five butts measure 2½ inches in thickness.



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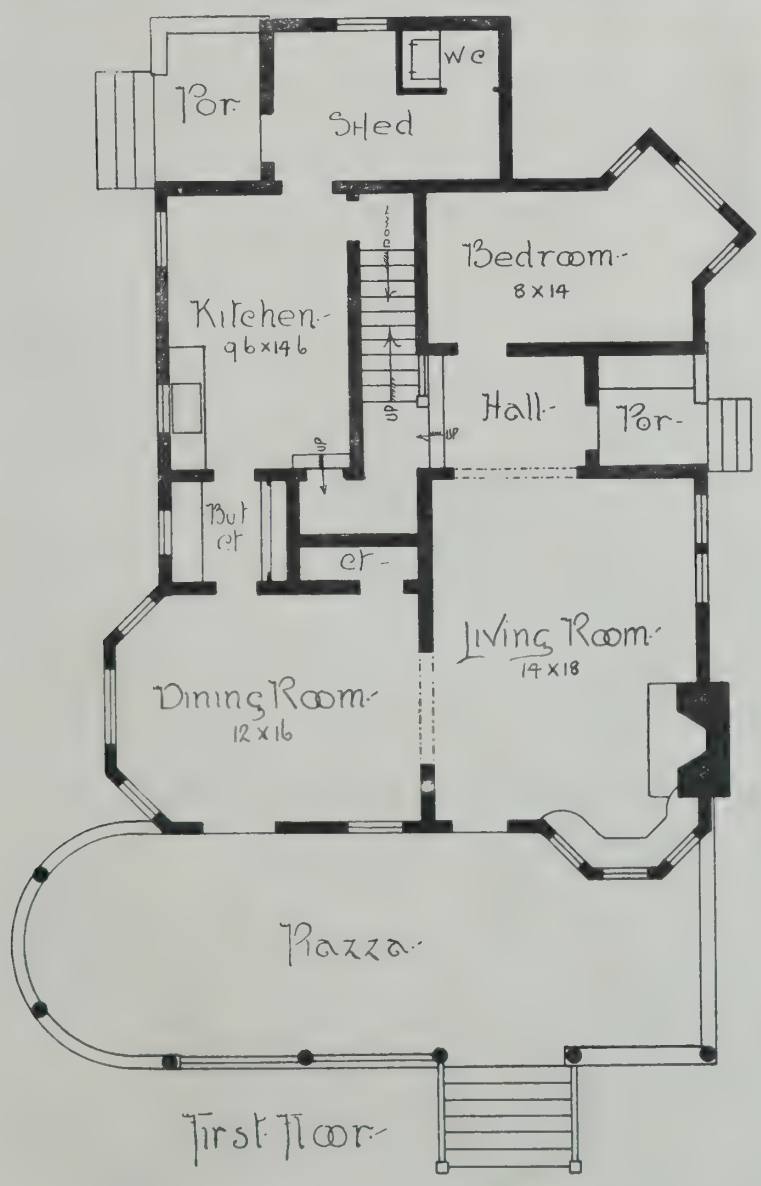
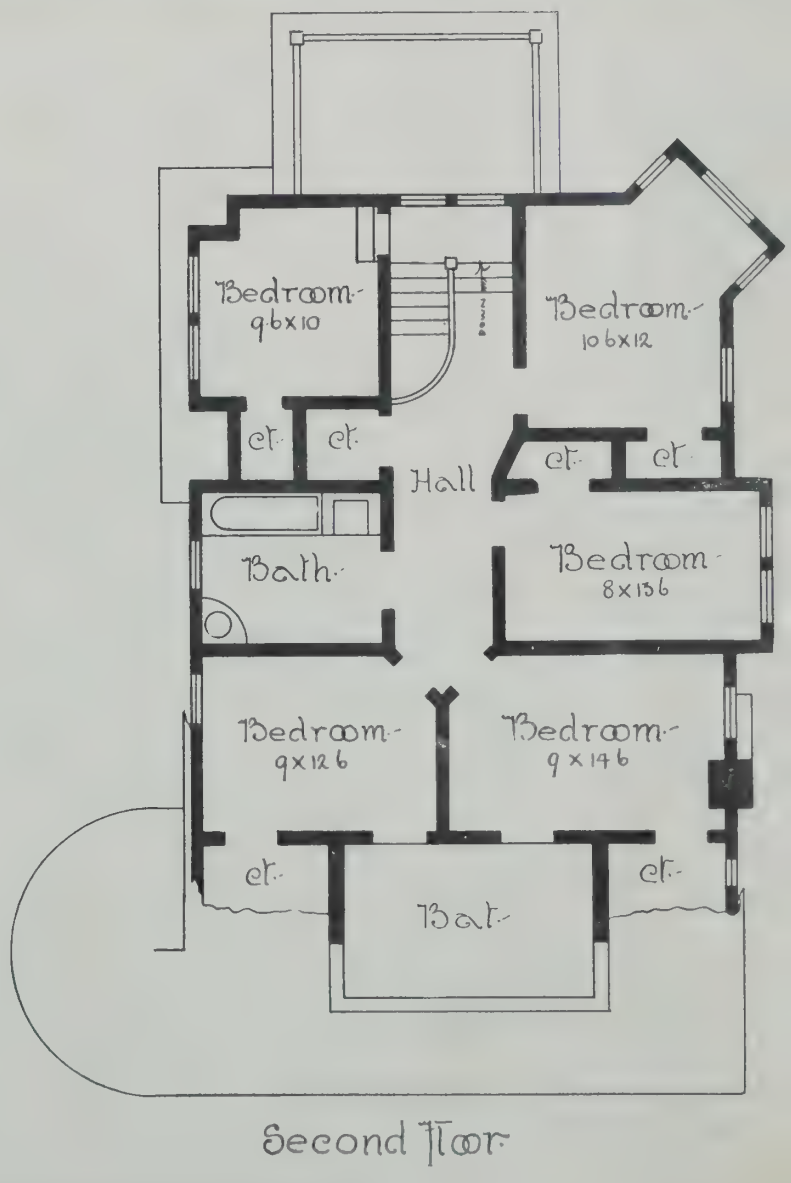
A RESIDENCE AT GLENWOOD, N. Y.—See page 2.





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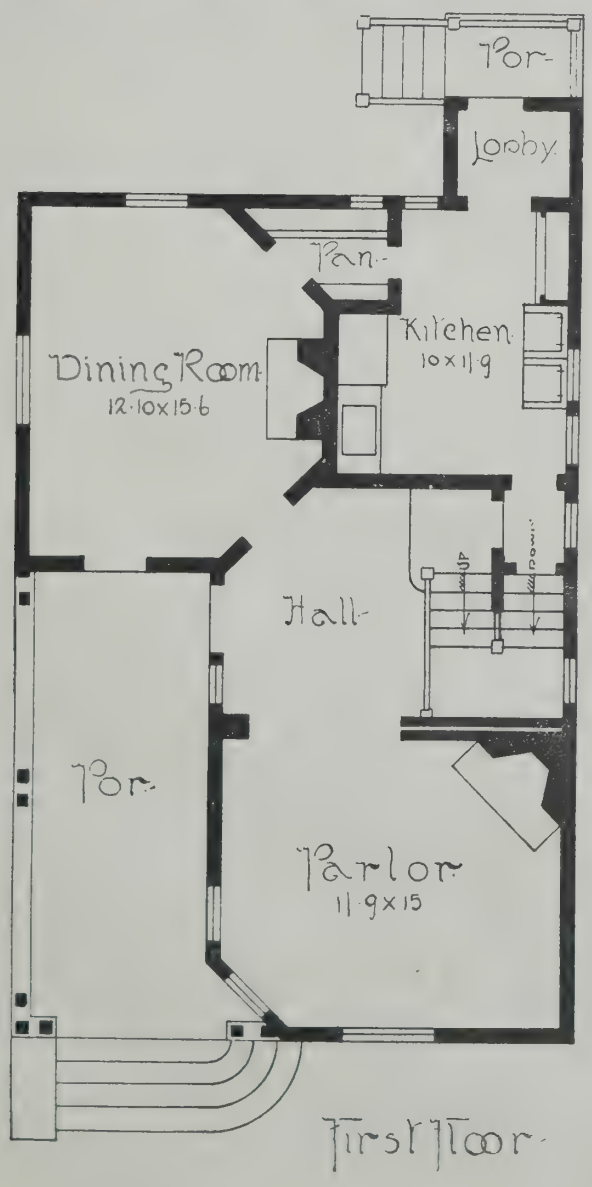
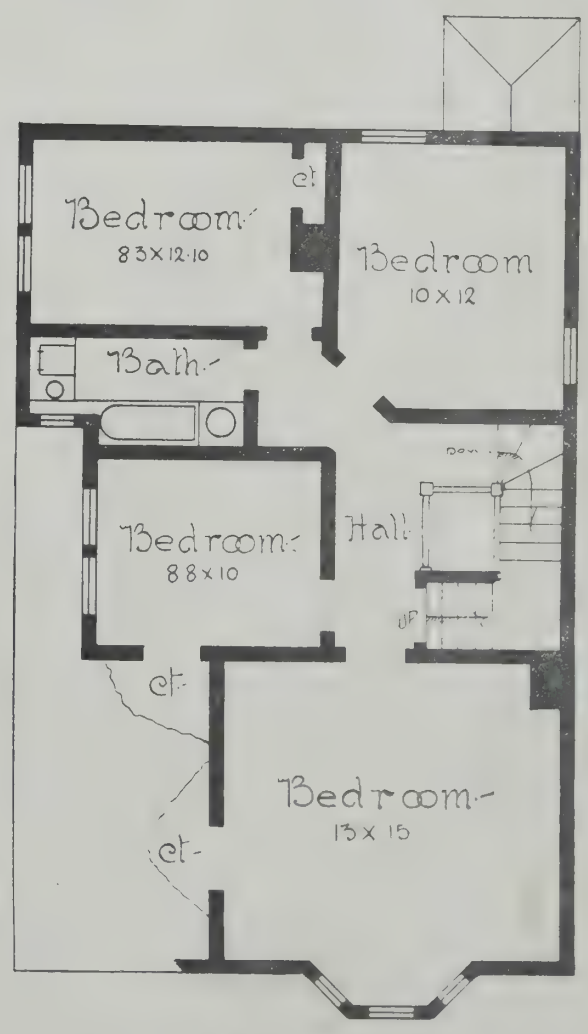
A SUMMER COTTAGE AT GREAT DIAMOND ISLAND, ME.—See page 2.

A RESIDENCE AT GLENWOOD, N. Y.—See page 2.

A SUMMER COTTAGE AT GREAT DIAMOND ISLAND, ME.—See page 2.

LIBRARY





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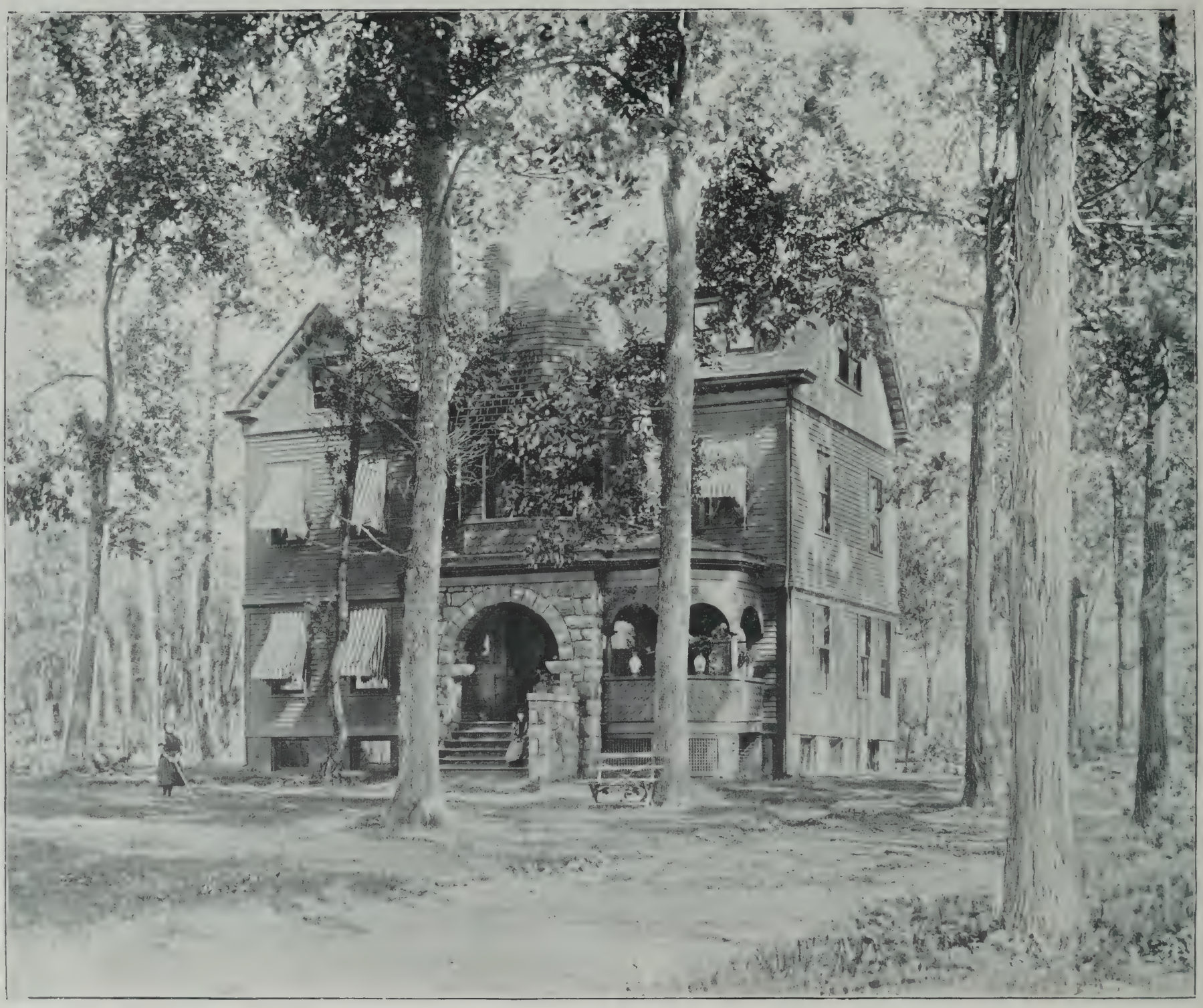
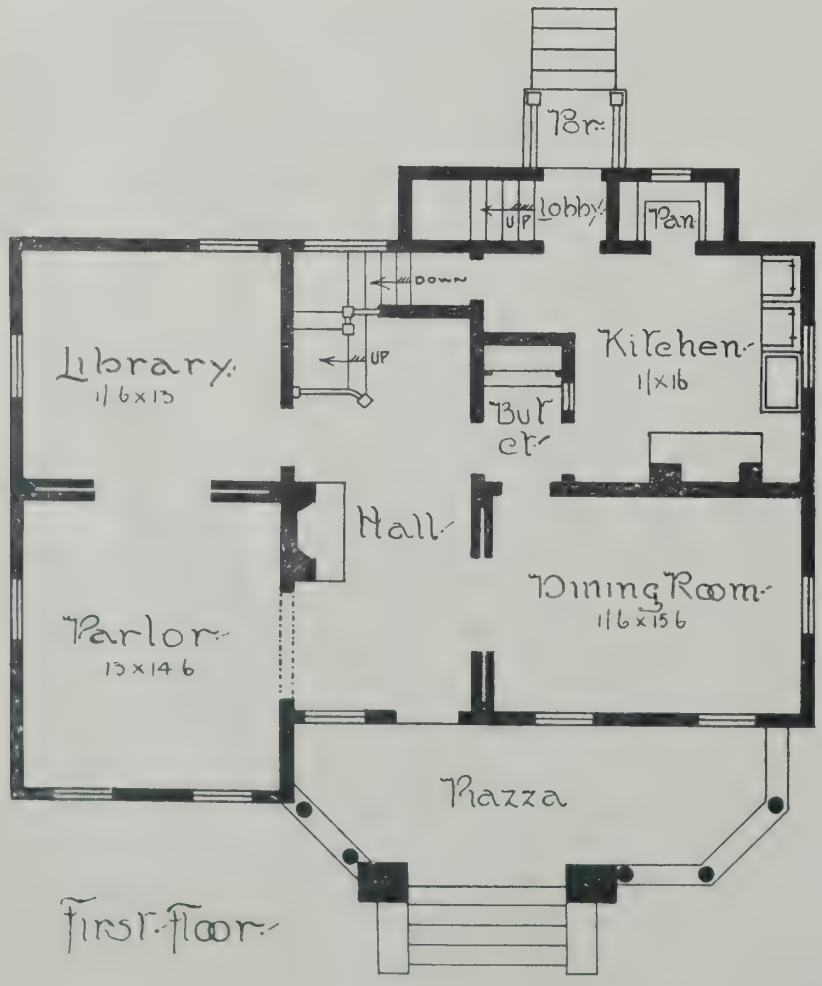
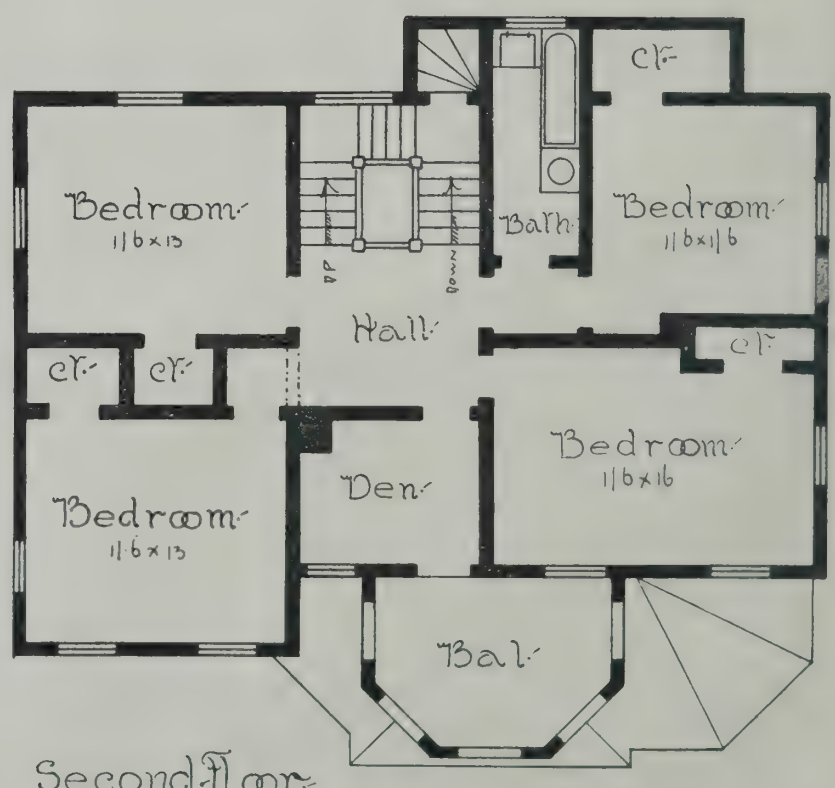
A COTTAGE AT NEW ROCHELLE, N. Y.—See page 2.







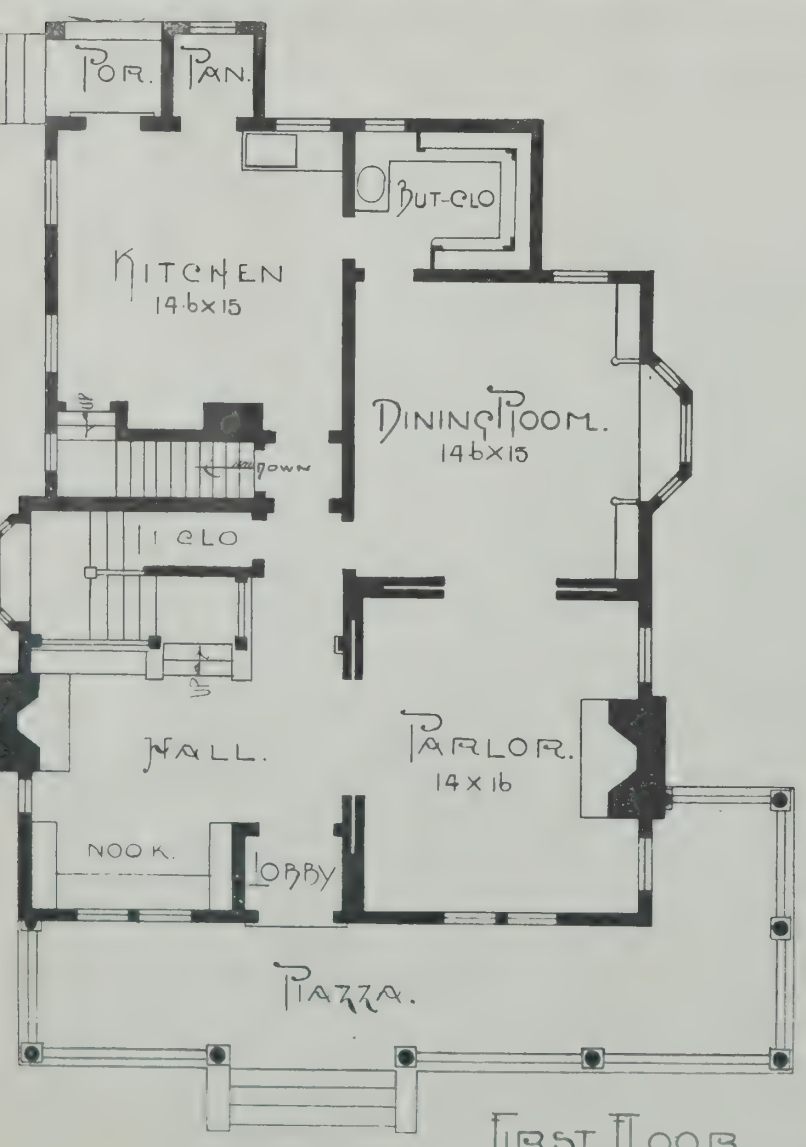
A DWELLING AT OAKWOOD, STATEN ISLAND.—See page 2.

BOSTON PUBLIC LIBRARY

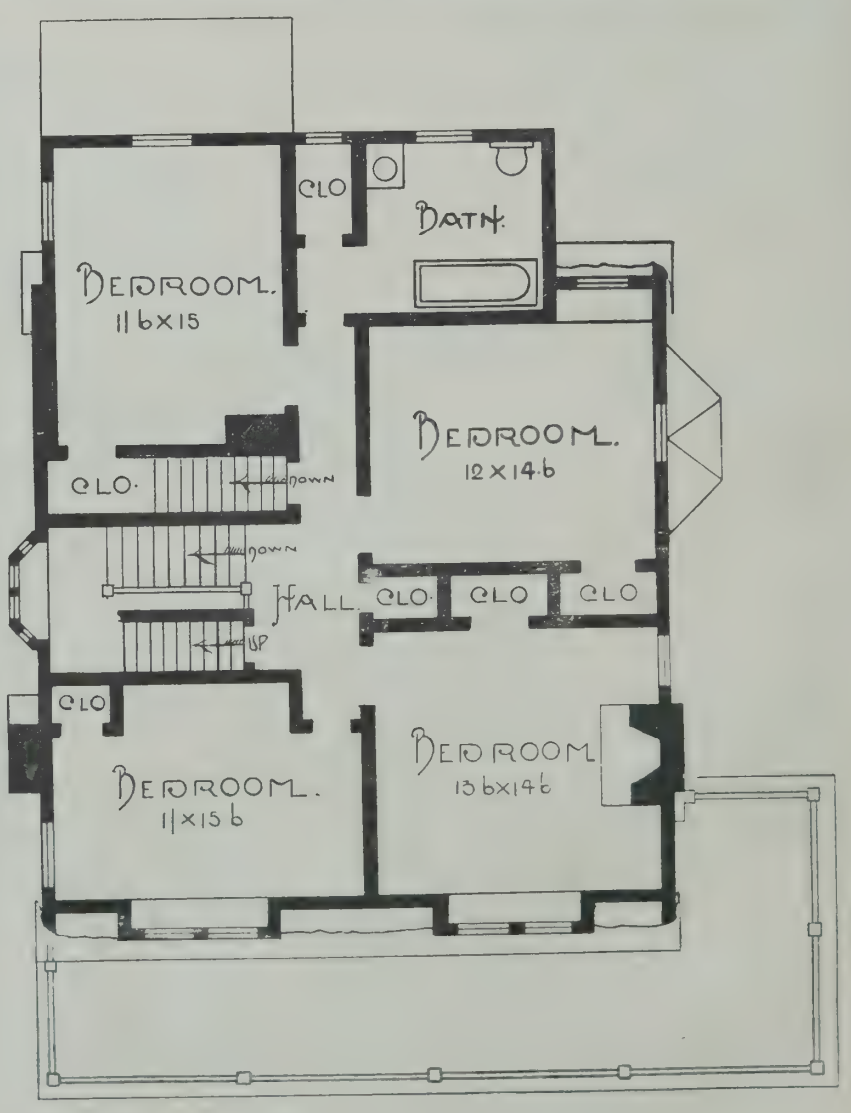
A DWELLING AT OAKWOOD, STATEN ISLAND.—See page 2.

A DWELLING AT SPRINGFIELD, MASS.—See page 2.

BOSTON PUBLIC



FIRST. FLOOR.



SECOND. FLOOR.

A DWELLING AT SPRINGFIELD, MASS.—See page 2.

BOSTON PUBLIC

A HOUSE IN THE COLONIAL STYLE.—See page 3.

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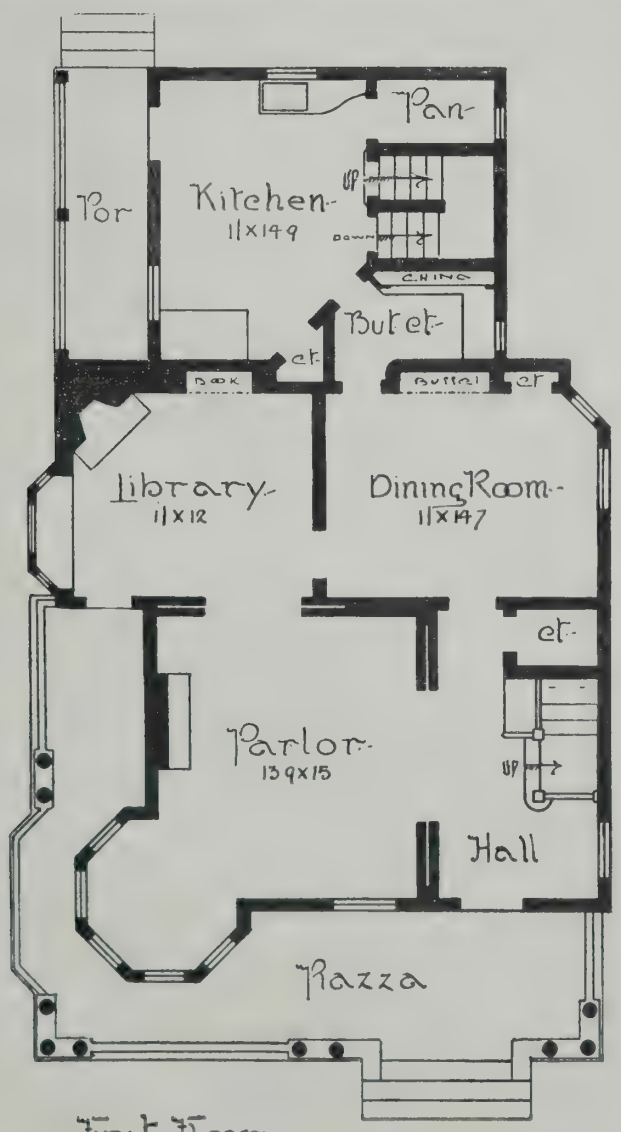
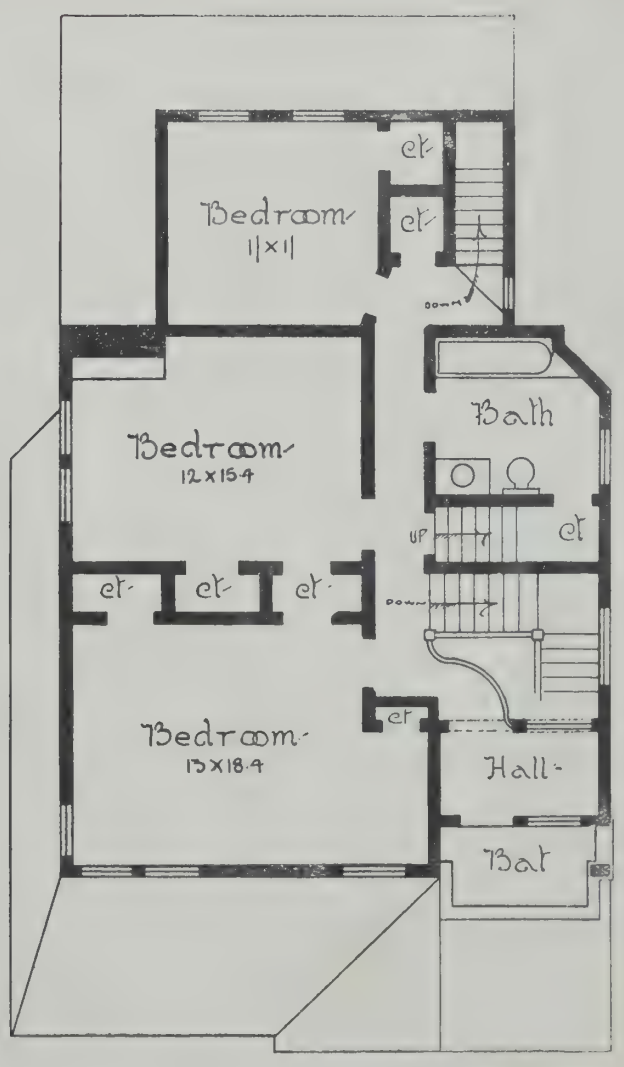
A DWELLING AT BRIDGEPORT, CONN.—See page 3.



First Floor.



Second Floor.

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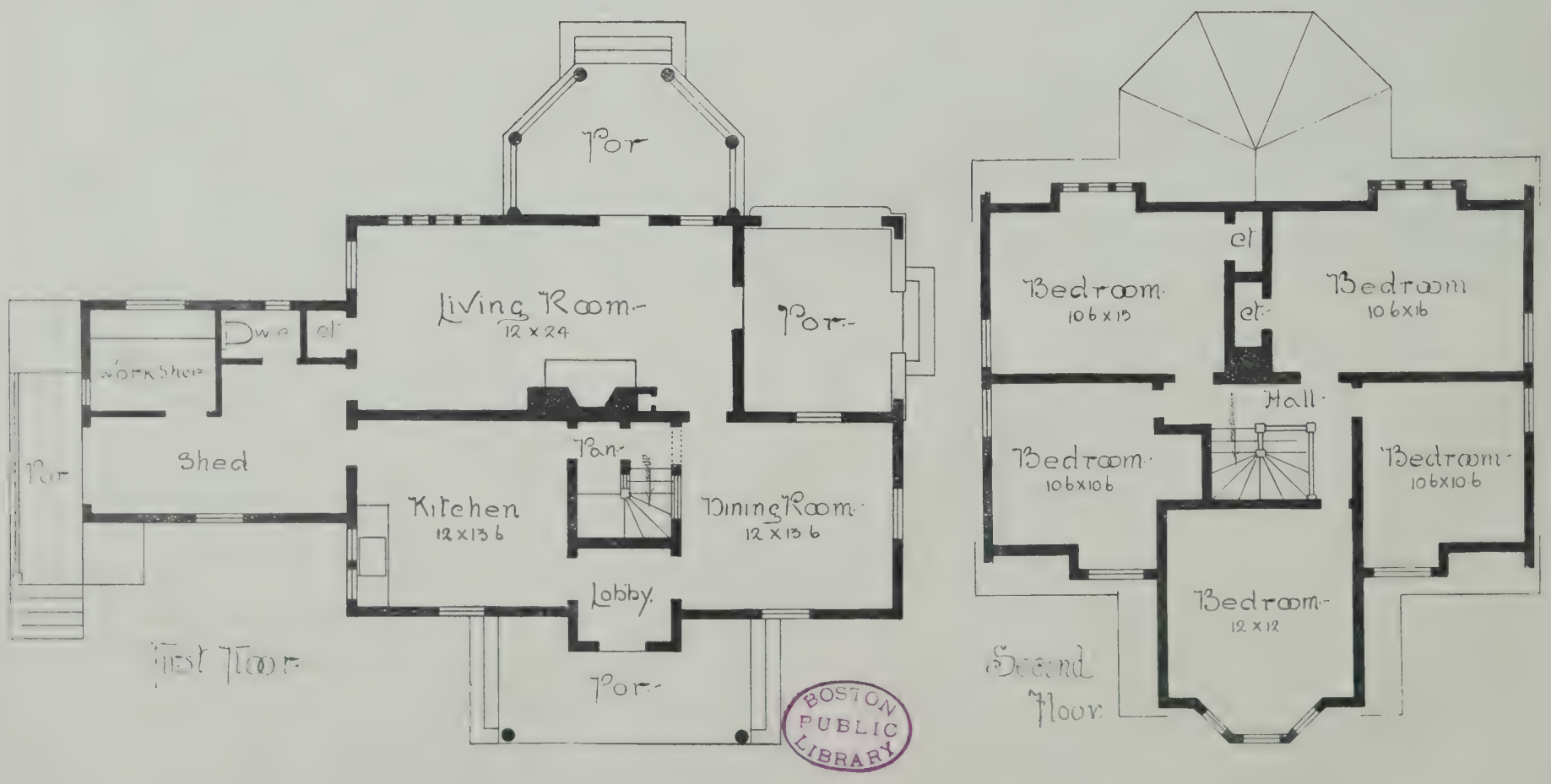
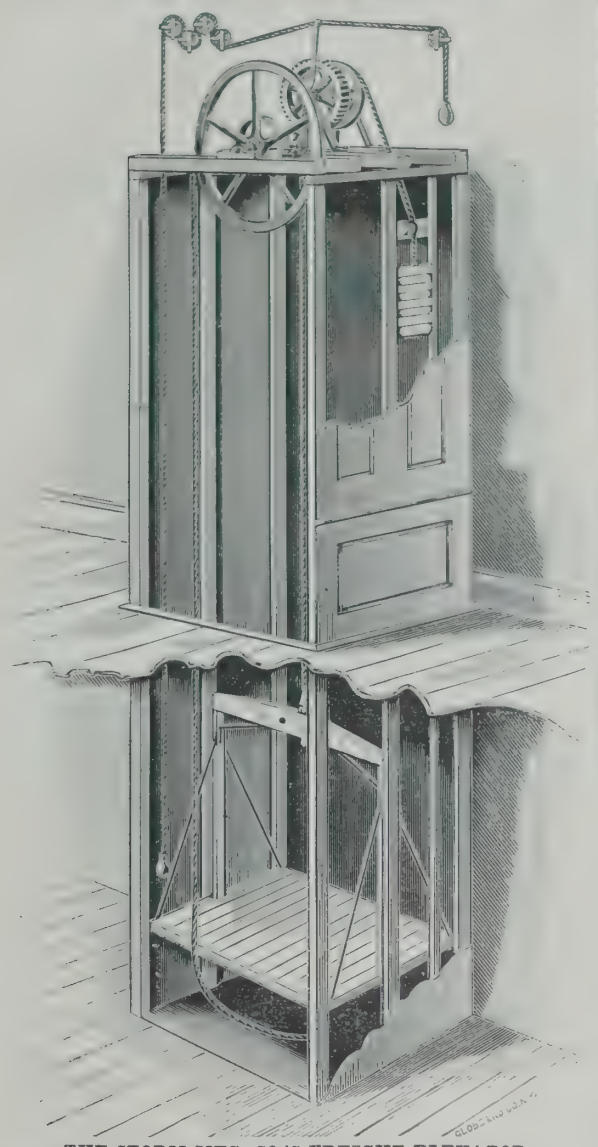
A DWELLING AT BRIDGEPORT, CONN.—See page 3.



"GRAYWOOD," A COTTAGE AT KENNEBUNKPORT, ME.—See page 3.

DUMB-WAITERS AND ELEVATORS.



THE STORM MFG. CO.'S FREIGHT ELEVATOR.

The Storm Manufacturing Company, of Newark, N. J., has been making dumb waiters and elevators of various kinds for a number of years. Their line contains almost everything in the way of hoisting appliances, from the smallest dumb-waiter to the large and powerful elevator. One of the accompanying illustrations represents a dumb-waiter which has attained a high degree of popularity, and another shows a standard freight elevator, combining a maximum of strength with the least possible weight. All of their machines are equipped with the best and newest devices for speed, safety and durability, and are thoroughly first class in all respects, and at the same time moderate in price. They will be pleased to furnish catalogue and prices on application.

Saws.

The combination, in one great company, of a number of saw manufacturers, each one of which had previously achieved a world-wide reputation, enables the National Saw Company to present a catalogue and price list of peculiar interest. The company is now operating the works of Messrs. Wheeler, Madden & Clemson, Middletown, N. Y.; Richardson Brothers, Newark, N. J.; Woodrough & McParlin, Cincinnati, O.; and the Harvey W. Peace Company, Brooklyn, N. Y.; and their just issued catalogue embraces almost every description of saw which can be called for, the saws being shown in fine illustrations, accompanied by full description. The headquarters of the company are at Newark, N. J., a location which possesses unrivaled facilities for shipping goods at the lowest rates. A copy of this handsome and very complete catalogue may be obtained on application to the general office of the National Saw Company, Newark, N. J.

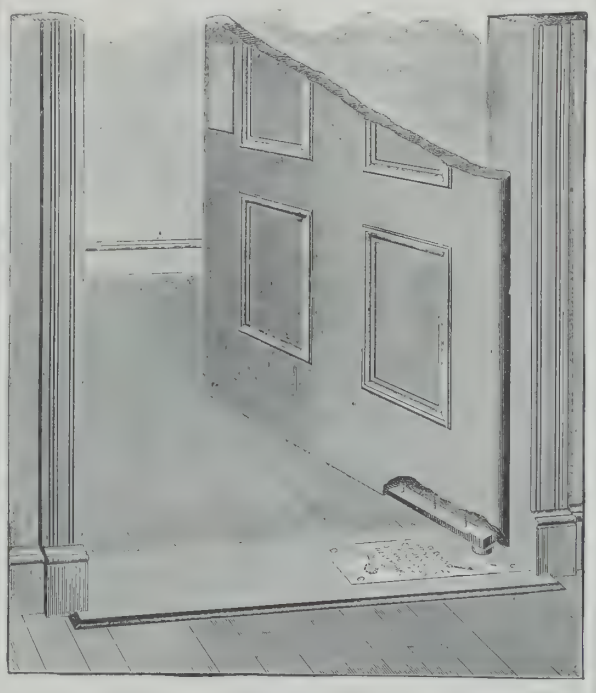
THE electric elevators made by the Sulzer-Vogt Machine Co., of Louisville, Ky., are said to be fast replacing those run by other power, and the firm claim that their electric elevators are now more economical than others in the cost of running, as well as effecting a saving in space occupied, and being more convenient and easy of operation. Those intending to put in elevators should send for the latest catalogue of the firm.

Translucent Fabric.

This material, designed to largely replace glass in building, has for its basis wire cloth, made of the best steel, and running twelve meshes to the inch. This cloth is covered, and its meshes are filled in, with an impervious, translucent substance, and the finished material is made in sheets of 1-16 to ⅛ of an inch in thickness. It is very pliable, and is capable of being bent in any shape without injury, a consideration of especial advantage where the material is used in roofs which are curved or have angles; likewise, owing to its flexibility, it is possible to make absolutely water-tight joints, which it is almost impossible to do with glass. Translucent fabric is water and weather proof, and is said to be unaffected by the heat of the sun, frost, hail, rain, or any kind of atmospheric changes. It being a non-conductor, buildings covered with it are warmer in winter and cooler in summer. In weight, it is very much lighter than glass, averaging from ⅓ to ½ lb. per square foot, and, consequently, it allows great economy in roof construction. As regards cost, translucent fabric is slightly more expensive than glass, but, owing to the less expensive construction which its use will admit of, the absence of breakage, and its cheaper cost of transportation, is said to be really cheaper. It may be used with special advantage in skylights, windows, etc., for mills, factories, train sheds, foundries, exhibition buildings, gunpowder factories, hospitals, studios, conservatories, forcing beds, etc. It is manufactured by the Translucent Fabric Co., 64 Federal Street, Boston, Mass.

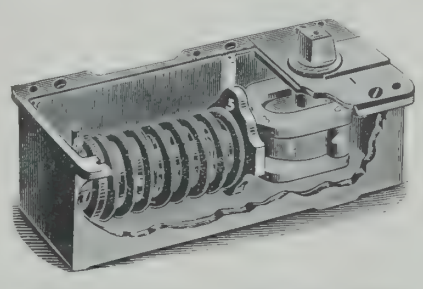
IMPROVED SPRING HINGES.

A practical double acting spring hinge, combined with a device for checking the sudden action of the spring, is shown in the accompanying illustration. It is adapted for all doors where automatic closing by a gentle and silent action is desired, and several thousand of them are now in use. These hinges are manufactured by Joseph



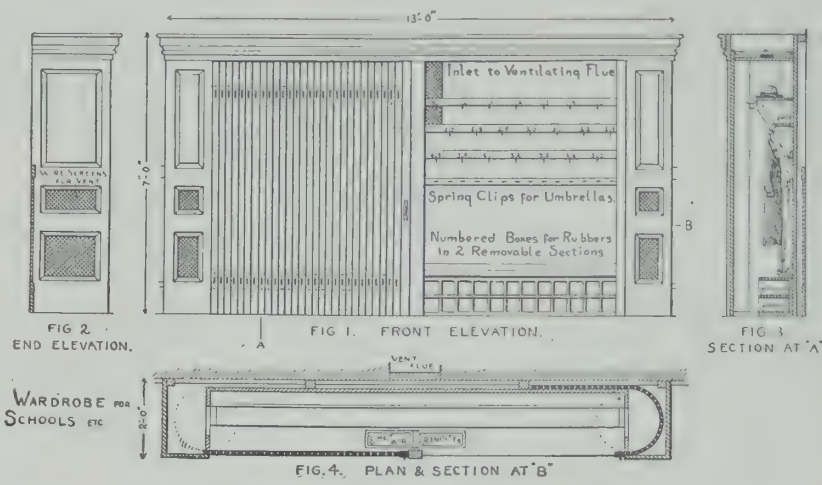
THE BARDSLEY CHECKING SPRING HINGE FOR SPRING DOORS.

Bardsley, 153 Baxter Street, New York City. The mechanism is in a closed iron casing, let into the floor or sill, and covered by a brass plate, and the casing is nearly filled with a non-freezing liquid, which serves as a checking medium as well as a lubricant. The springs are not twisted, but compressed, and the greatest pressure of the spring is at the closing point. The small cut shows the working parts of the hinge, and its action is as follows: As the door is opened the cam (2) is turned, and this, pressing against the roller (4), draws up the fork (3), and with it the cylinder (6), at the same time compressing the spring, the stop (5) holding that end of the spring stationary. When the door is closing, the spring forces back the cylinder (6) upon the piston (7), which is fastened to the end of the box, imprisoning the liquid, which can only escape back into the box through a small aperture controlled by the checking pin (8); this pin has a graduated escapement, and by turning it to the right or left the door is allowed to shut slowly or quickly.



AN IMPROVED SCHOOL WARDROBE.

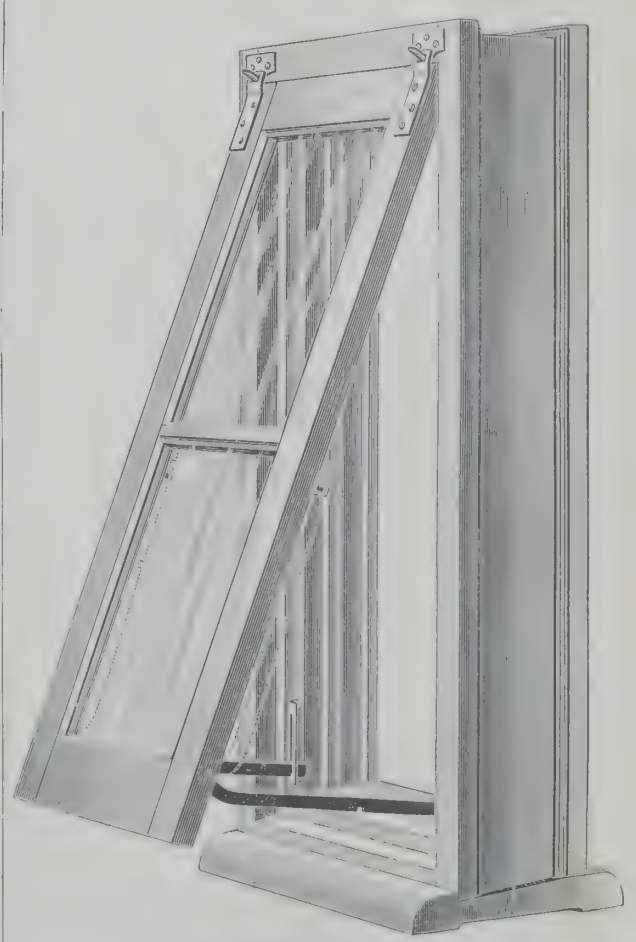
The accompanying illustration represents a style of wardrobe which has been adopted by the Brooklyn Board of Education, as well as numerous other bodies having control of the public schools in the leading cities. This improved wardrobe is manufactured by the Flexible Door and Shutter Company, of Worcester, Mass. It is 13 feet wide and 2 feet deep, placed against the wall, in the hallway, and will provide closet room for 40 or 50 pupils. The hooks, umbrella clips, and pigeon holes for overshoes are in plain view, arranged and numbered vertically, in sets, with corresponding numbers, to best accommodate pupils of all ages. The doors are provided with good locks; the keys to same, in charge of monitor, teacher, or janitor, afford security to clothing and valuables from thieves and tramps. The side and end panels are provided with strong wire netting. At the top is an opening of sufficient area to connect with the nearest ventilating flue. A forced draught is recommended where practicable. Hot air from furnace or steam pipes may be introduced through a register within the floor space of wardrobe, to dry and warm the clothing, during wet or cold weather, which from a sanitary standpoint is a most desirable feature of the system; also applicable to gymnasium, armory and society lockers. Section, Fig. 3, shows the clothing suspended from hooks, arranged on steps. The shelves are made of slats, to allow for a free circulation of air. Umbrellas are held in place by special spring clips, as shown, and an inclined trough conducts the drip to waste pipe or pail. The numbered boxes for overshoes are in two removable sections.



VENTILATED SCHOOL WARDROBES.

A HANGER FOR STORM SASH AND SCREENS.

By means of the improvement shown in the accompanying illustration, storm sash and screens may be easily hung and removed at any time. The hanger is made by the Phenix Manufacturing Co., of Milwaukee,

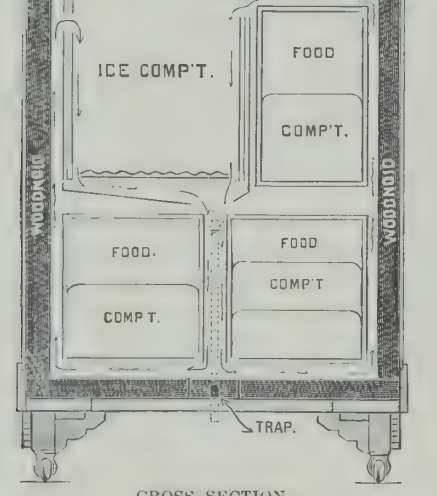


THE PHENIX HANGER.

Wis. It can be easily and conveniently adjusted, affording a practical screen for the entire window, insuring efficient ventilation, and facilitatiug the cleaning of windows.

THE HYGIENIC REFRIGERATOR.

The illustration represents a refrigerator which has met with very extended favor from the public, and which is styled "hygienic," principally because of the facility with which it can be kept absolutely clean. In each refrigerator there are from three to six compartments that are entirely separate, having individual doors and no communication with each other. The compartments are cooled by the cold air from the ice circulating around them, the cold being conducted through the metal of which they are made. The body, covers and doors are made of a specially prepared non-conductor, styled woodnoid, the walls being of one solid thickness. All the compartments being removable, they can be cleansed as easily as the ordinary kitchen utensils, and the construction insures a perfect circulation, whereby the best cooling results are obtained with the minimum consumption of ice. These refrigerators are manufactured by the Hygienic Refrigerator Co , of No. 35 Hanover street, Boston.



CROSS SECTION.

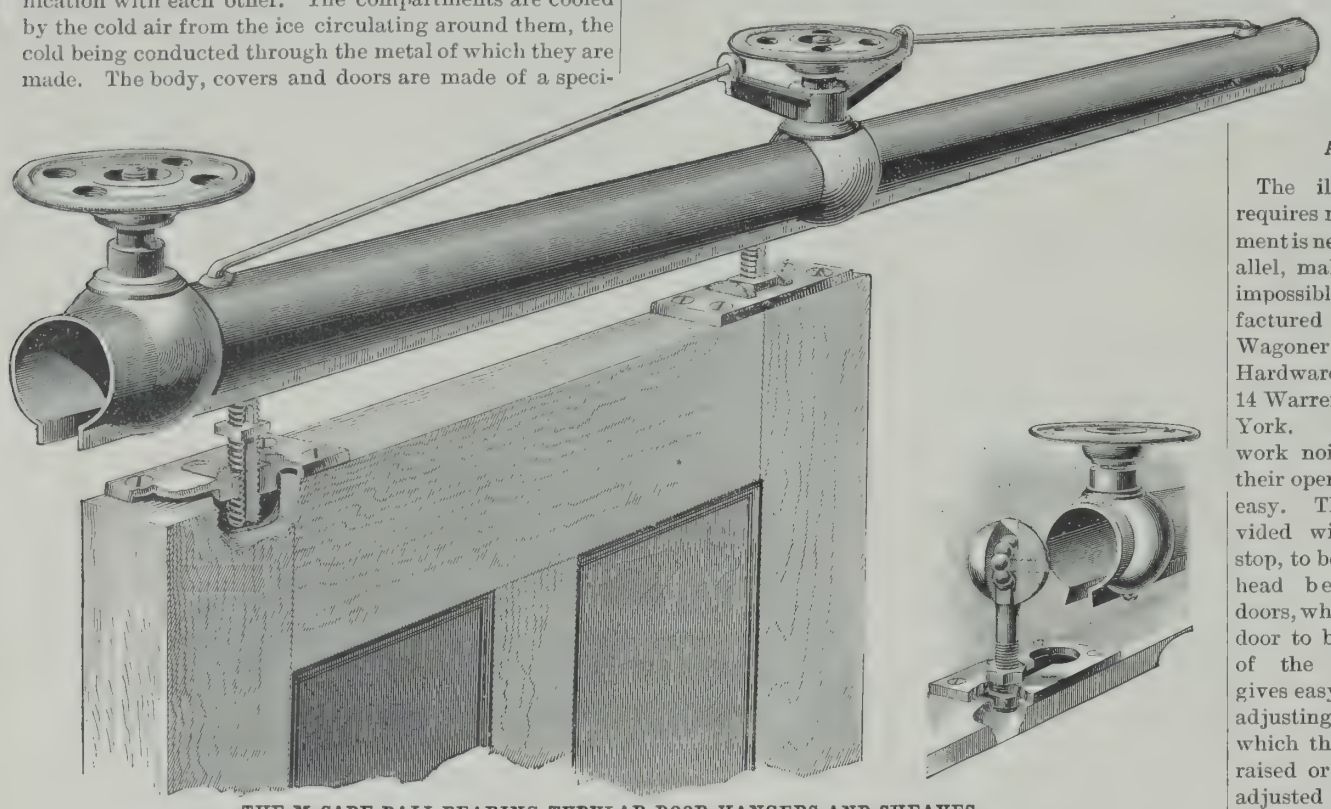
STYLE H.

THE HYGIENIC REFRIGERATOR.

THE Asbestine Cold Water Paint, made by George S. Adams, of No. 5 Court Street, Brooklyn, is said to be very economical, and to present great advantages for the whitening of walls and ceilings in factories, breweries, sheds, warehouses, stables, cellars, etc. It is in powder form, ready for use by simply mixing with cold water. Samples are sent for trial, when desired.

IMPROVED DOOR HANGERS.

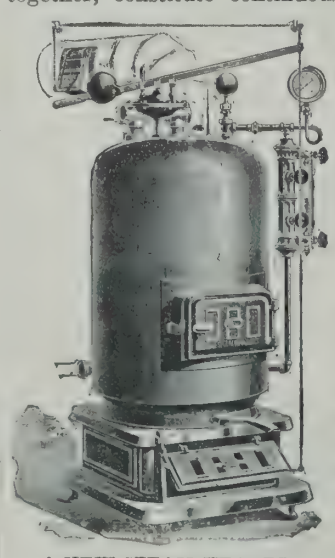
This door hanger consists of a tube of drawn steel, with a parallel slot with flanges on both sides, in which runs the carriage. It is strong, simple and durable, and the carriage is composed of two hemispherical cones, a hanging strap, and nine universal balls. These improved hangers are manufactured by the McCabe Manufacturing Co., Nos. 532 to 544 West 22d Street, New York City. The small view represents the ball bearing, the balls turning on the cones and in a groove of the hanging strop, thereby reducing friction to a minimum. The track is stiff and rigid, and being round, with an opening at the bottom, it is absolutely impossible for it to clog, there being no place wherein snow, ice, dust, or other matter could lodge, and thus impede the free action of the doors. Attention is also called to the truss which holds the pocket end of the track, by means of which the heaviest doors can be hung without causing any deflection. Any tendency to sag is counteracted by means of the nuts which fasten the rods to the truss bridge on the centre of the tube. The method of attaching the carriages to the door is also easy and firm.



THE McCABE BALL-BEARING TUBULAR DOOR HANGERS AND SHEAVES.

AN IMPROVED STEAM HEATER.

We illustrate herewith a new steam boiler brought out by the J. L. Mott Iron Works, of Beekman Street, New York, and Wabash Avenue, Chicago. It is especially adapted for small and medium sized residences, and is made in two semicircular sections, each being complete in itself, and, when placed together, forming the boiler, as shown in the cut. The joints are all made on the outside, and are screwed together, iron to iron, no packing whatever being needed. The interior parts form a series of deep corrugations, which, when the sections are placed together, constitute continuous vertical flues, which present a large amount of heating surface direct to the action of the fire. Movable deflecting plates are also provided, which may be adjusted or taken out to adapt the heater to chimneys of different draughts. The smoke passages are all vertical, and leave no place for the collection of dust or obstructions. The water passages are connected, and every part exposed to the fire is vertical, thus providing for a complete circulation within the boiler, to prevent danger of priming. The boiler has a steam dome of ample capacity to insure a steady supply of dry steam. This boiler is made in four sizes, to supply houses taking from 250 to 500 square feet of steam radiation. The manufacturers claim that the ratings of these boilers are absolutely safe, and that the amount of surface they are rated to carry is the actual working capacity.



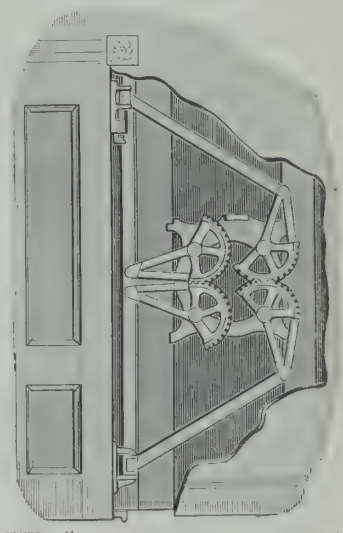
A NEW STEAM HEATER.

Concrete Roofs.

Flat roofs have several advantages, and can conveniently be constructed of concrete, with iron or steel girders at intervals. If the under side of the concrete has to be the ceiling of the room below, it may be desirable that it should be quite flat. In this case, the necessary falls and gutters can be formed with rough concrete, laid on the top of the main body of concrete. The best material for finishing such roofs externally is asphalt.

A TRACKLESS SLIDING DOOR HANGER.

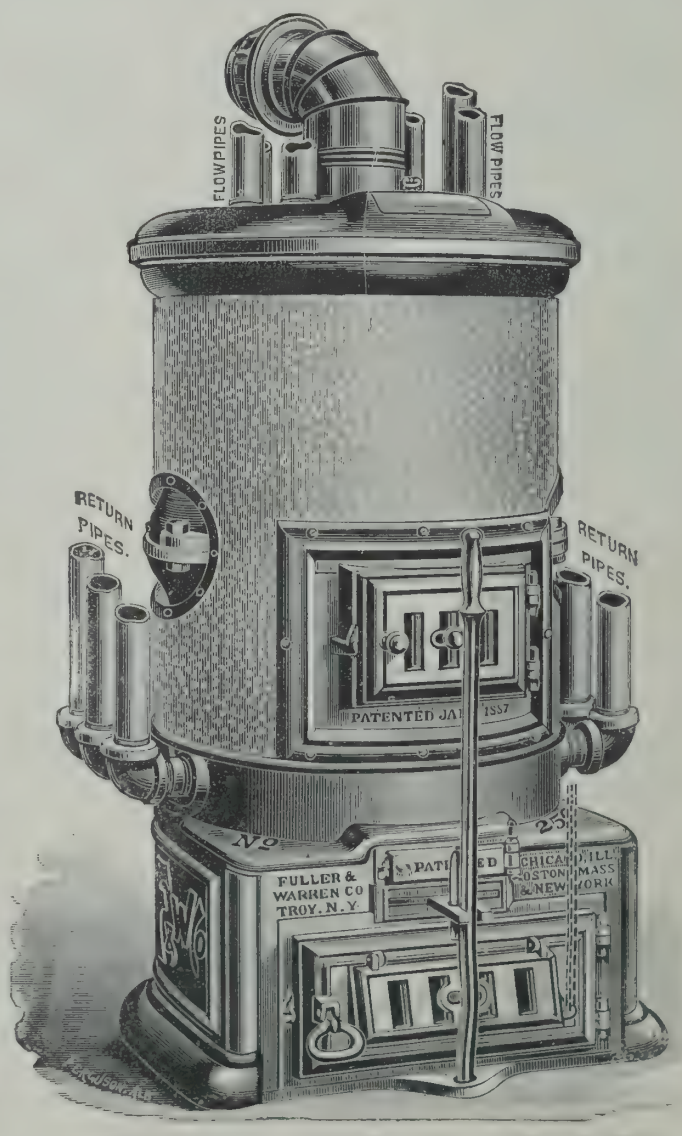
The illustration represents a door hanger, which requires no track above or below, and in which the movement is necessarily parallel, making binding impossible. It is manufactured by the Van Wagoner & Williams Hardware Co., of No. 14 Warren Street, New York. The hangers work noiselessly, and their operation is very easy. They are provided with a gravity stop, to be placed overhead between the doors, which allows the door to be drawn out of the pocket, and gives easy access to the adjusting screws, by which the door can be raised or lowered and adjusted plumb. The different parts are made to carry three times the weight of ordinary doors.



THE "AMERICAN TRACKLESS" SLIDING DOOR HANGER.

A FIRST-CLASS HOT WATER HEATER.

The heater shown in the illustration has a double water section, and is arranged for divided flow and return. A rear view of the same boiler was shown in our May number. These heaters are made in many styles and sizes by the Fuller & Warren Co., of Troy, N. Y., and for very large buildings two of the heaters can be connected together with manifolds in such way that it is only necessary to run one heater in mild weather, thus saving greatly in the cost of fuel. They are also so constructed that the water may be taken directly from the heater in one large pipe. They are made wholly of cast iron, and so arranged that no water joints are exposed to the direct action of the fire.



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SCIENTIFIC AMERICAN

Building Edition.

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Vol. XX. No. 2. NEW YORK, AUGUST, 1895. Subscription, $2.50 a Year. Single Copies, 25 Cents.

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A RESIDENCE AT MONTCLAIR, N. J.—See page 18.

Scientific American.

ESTABLISHED 1845.

MUNN & Co., Editors and Proprietors,

No. 361 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

NEW YORK, AUGUST, 1895.

THE

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A RESIDENCE AT MONTCLAIR, N. J.

In our number for May last, page 72, we gave a view of this elegant residence, together with the floor plans. We now present, on page 17, another photographic view of the same house, taken from a different standpoint, which brings out so many striking features, not seen in our May plate, that we have thought our readers would be interested in examining and comparing the two illustrations. The description of the house will be found in the number above mentioned.

A DWELLING AT SCRANTON, PA.

On page 20 we illustrate a Colonial house, erected for Fred. Kingsbury, Esq., at Scranton, Pa. Our view shows a rather simple, yet pleasing exterior, having a broad, well shaded porch running the full front. Ionic columns support the balcony above; a dormer window of neat detail relieves the lines of the plain gabled roof. Dimensions: Front, 29 ft. 6 in.; side, 44 ft. 6 in., including projection of front porch. Heights: Cellar, 7 ft.; first story, 9 ft.; second, 9 ft.; third or attic, 8 ft. Underpinning of local stone. Structure above, sheathed, papered, clapboarded and painted Colonial yellow. Roof shingled and stained dark green; shutters painted same color. Trimmings white. The plan shows a vestibule, with door to large reception hall, having fireplace and broad arch, with supporting columns to bay. Staircase has ornamental newel and turned balusters. Parlor connects with dining-room by sliding doors; the latter room has bay its full width, balanced by fireplace on opposite side, and communicates through butler's pantry, provided with dresser, etc., with kitchen. Hardwood floors throughout this story. Second floor plan shows four chambers, having sufficient closet room and bath, with usual fixtures. The attic has three rooms finished off. The trim throughout the house is whitewood, natural. Cellar, cemented, contains hot air furnace, coal storage, etc. Cost complete $4,500. E. G. W. Dietrich, Esq., architect, 18 Broadway, New York City.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT RESIDENCE PARK, NEW ROCHELLE, N. Y.

We present on page 21 a residence recently erected for George B. Colby, Esq., at residence Park, New Rochelle, N. Y. The design is one of the most unique examples for a cottage dwelling, and the perspective views show elevations that are ornamented sufficiently to give them an artistic appearance, while the floor plans show a good interior arrangement. The underpinning is built of "rock-faced" field stone, laid up at random. The superstructure above is shingled on the exterior throughout, and is left to weather finish. The roof is finished and treated in a similar manner. The trimmings are painted white. Dimensions: Front, 27 ft.; side, 32 ft. 6 in., not including rear porch; height of ceilings, cellar, 8 ft.; first story, 9 ft. 6 in.; second, 8 ft. 6 in.; third, 8 ft. Hall is trimmed with oak. It has a Dutch entrance door, hardwood floor, paneled divan, and an ornamental staircase, lighted by a stained glass window. Parlor and dining-room are separated by an archway, provided with a transom filled in with spindlework. These two apartments and all other rooms throughout the interior are trimmed with whitewood and finished natural. The fireplace is built of brick, with facings and hearth of tiles, and is furnished with a mantel of carved oak. The nook in dining-room is provided with spindle transom and seats. Pantry and kitchen are wainscoted with narrow beaded stuff, and provided with the usual fixtures complete. Second floor contains three bedrooms, closets and bathroom, the latter wainscoted and fitted up replete. One bedroom and trunk room on third floor. Cemented cellar contains furnace, laundry, and other apartments. Mr. G. Kramer Thompson, architect, New York, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT SOUTH ORANGE, N. J.

We publish on page 22 a cottage erected for the Rev. Stanley White, at Hillside Avenue, South Orange, N. J. A novel feature shown in the ground plan is a side entrance, thereby utilizing all the front space for the main living apartment. The design is treated throughout in the Colonial style. The foundation is built of stone. The first story is covered on the exterior with matched sheathing, plaster boards, and then coated with two coats of Portland cement. It has a brush coat of similar cement, leaving a rough stucco finish. The second story is shingled, and stained a dull shade of green. The roof is shingled, and finished natural. Dimensions: Front, 28 ft. 6 in.; side, 53 ft., not including porch. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The vestibule is paneled. A unique feature is the door cut under the stairway, large enough to admit a child's carriage. This vestibule and doors are painted a dull shade of green. The hall is trimmed with whitewood, and stained and finished in oak. It contains an ornamental staircase, with spindle balusters and newel posts. It is lighted by a stained glass window with excellent effect. The reception room is provided with nook, containing paneled seats, and an archway, with a spindle transom, and a large, open fireplace, with tiled hearth and facings, and a neat Colonial mantel. This room is finished with delicate colors. The library is trimmed with whitewood, stained and finished in a sea green, with a cool and pleasing effect. It has ceiling beams, bookcases built in, paneled divan, and an open fireplace built of Tiffany brick, with hearth of same, wrought iron trimmings, and a mantel shelf. Dining-room is trimmed with ash. It is well lighted, provided with a porch, and an open fireplace, furnished same as one in library. The pantries and kitchen are wainscoted and trimmed with yellow pine. The pantries are well fitted up with the best modern conveniences, and the kitchen is complete, with stairs leading to cellar and second floor. The second floor contains four bedrooms, dressing-room and bathroom, the latter wainscoted and furnished complete. The third floor contains one large bedroom and a trunk room. Two other bedrooms could be provided, if desired. Cemented cellar contains furnace, laundry and other apartments. The house was designed by the Rev. Stanley White, and was built by H. M. Matthew, of Orange, N. J.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A HOUSE AT SUMMIT, N. J.

On page 23 of this issue we show a new white Colonial house, with a gambrel roof, recently erected at Summit, N. J. As will be seen by the floor plans, this is a very complete and comfortably arranged house, having a front, side and rear porch. In localities where the view would require it, another side porch could be placed at the opposite end of the building from that shown in the engraving. The first story contains a reception hall, opening with columns into the library, dining-room and staircase hall. On the left of the reception hall is a large library or parlor, with an ample fireplace and window seats. The rear of this is a den, or sitting-room, which has an opening from the side porch. The other side of the house contains dining-room, with a large, ample fireplace, and having a side window arranged above the side door. There is an ample and complete kitchen and butler's pantry. The second floor contains five well lighted bedrooms, all amply supplied with closets, and two bathrooms. It has a linen closet and lavatories under two of the bedrooms, and fireplaces under two of them. The attic floor contains five bedrooms and a storeroom. The house is heated throughout with hot water, and was made from the plans and under the supervision of Child & De Goll, architects, 62 New Street, New York.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE IN THE SUBURBS OF BROOKLYN, N. Y.

We publish on page 24 a cottage erected for Richard Ficken, Esq, at Eighteenth St. and Tennis Court, Flatbush, L. I. The design is broadly treated, having an entrance porch, running to line of octagonal bay, which becomes circular above, and is roofed with a conical tower, forming corner feature, and relieving the lines of the gambrel roof; detail in the Colonial style. Dimensions: Front, 31 ft. 4 in.; side, 49 ft. 4 in. Heights: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; attic, 8 ft. Underpinning of brick, stone sills to windows; framework above, sheathed, papered and clapboarded at first story, all above being shingled; color, light olive green; sash darker; front steps of stone. Entrance hall, with staircase as its principal feature, having ornamental newel and turned balusters, in ash, has openings to parlor and dining-room; the former room having bay its full width, and fireplace; wide sliding doors lead to the latter, also having bay and a fireplace at angle. Butler's pantry, with plenty of dresser room, is means of passage to kitchen, with usual fixtures. Second floor is divided into five rooms, with closets and bath, having fixtures of good make, and plumbing exposed. Attic has one room finished off, but space for three. Double floors throughout, finished, one being of comb grained yellow pine. Trim, except where noted, white pine. Cellar, cemented, contains heater, fuel storage, etc. Venetian blinds are used. Cost complete, $7,500. Messrs. J. C. Cady & Co., architects, New York. J. C. Sawkind, builder, Flatbush, L. I.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

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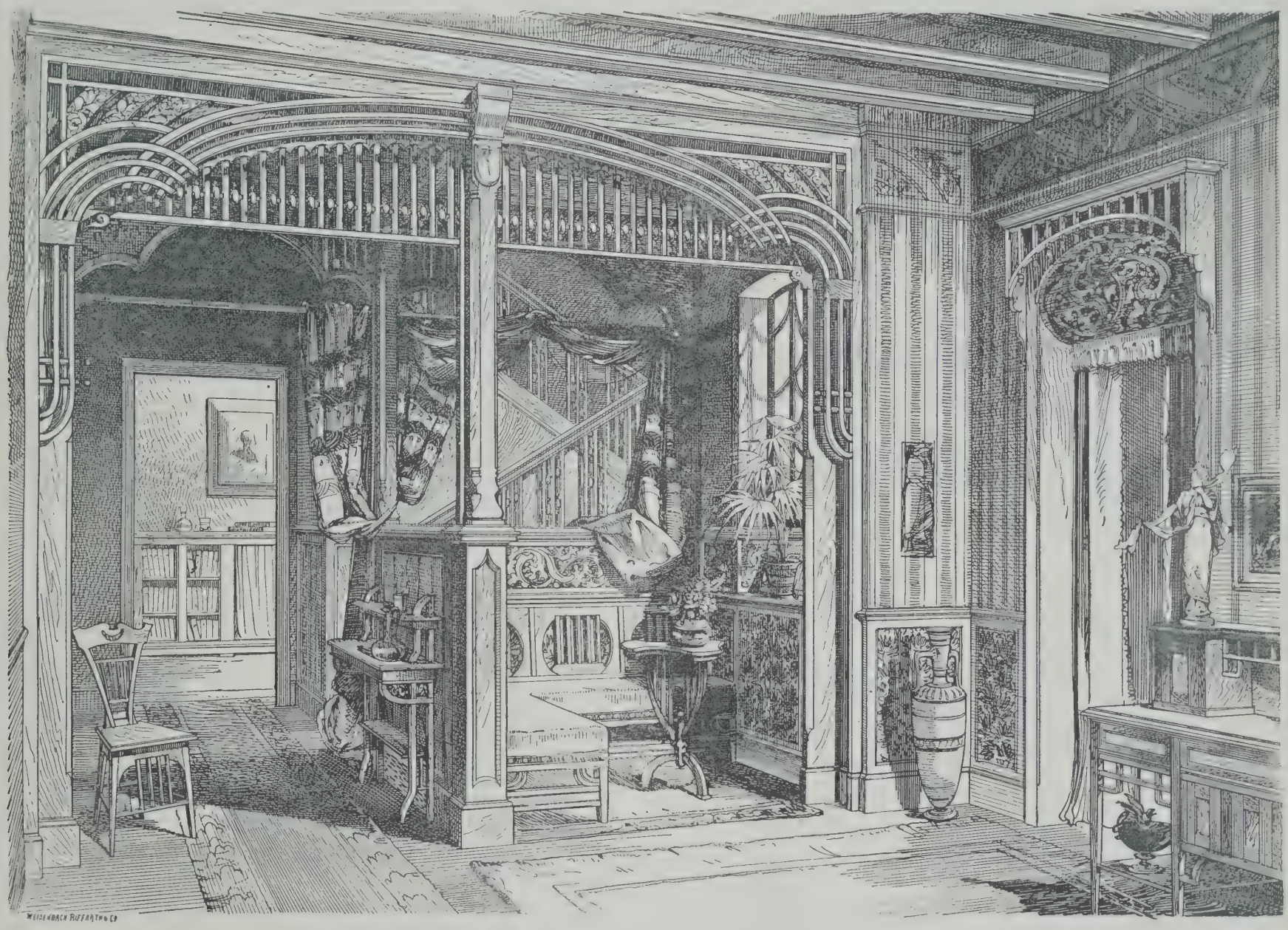
"LOVERS' DELL."

We publish, on pages 28 and 29, "Lovers' Dell," a residence which has been recently erected in New Jersey. The design is executed in the Colonial style, and is a pleasing example for a modern dwelling. The fluted columns, of the classic order, and leaded windows add much to the antique effect. A good feature of the plan is that the piazza is separate from the entrance porch. The underpinning is built of rock-faced red sandstone, the first story is built of similar stone, while the second story, of wood, is covered with shingles, and left to weather finish. The frieze and gables are filled in with stucco work. Trimmings are painted white. The roof is shingled, and left to finish natural. Dimensions: Front, 63 ft. 9 in.; side, 41 ft. 3 in., exclusive of porch and piazza. Height of ceilings: Cellar, 8 ft.; first story, 11 ft; second, 10 ft.; third, 8 ft. 6 in. Hall is trimmed with oak. It has a paneled divan and wainscoting The staircase is turned out of similar wood, with newel posts and candelabra. The doors and windows have heavy moulded casings. Parlor is treated in white and gold. It has a fireplace, with tiles, furnishings and mantel in keeping with the treatment of the room. Library is finished in cherry, and dining-room in oak, and each has open fireplace, fitted up same as the one already described. The latter is provided with a buffet, built in windows, a well shaded piazza, and veranda. The underpinning, first story and second story front are built of gray stone, rock faced, with red sandstone trimmings. The remainder of the building is constructed of wood, and the exterior walls are shingled, and painted a light shade of gray to harmonize with the stone work. The roof is covered with slate. Dimensions: Front, 47 ft. 6 in.; side, 52 ft., not including piazza. Height of ceilings: Cellar, 8 ft.; first story, 10 ft.; second, 9 ft. 6 in.: third, 8 ft. 6 in. The hall is a most unique apartment, and is trimmed with oak. It has a hardwood floor, paneled wainscoting and divan, and a nook separated from hall by a spindle transom. The fireplace is built of stone similar to the exterior wall, and finished with wrought iron trimmings; a bookcase is built in at one side, with a stained glass window over same. The staircase is a handsome one, with carved newel posts, and it is lighted by a cluster of stained glass windows, shedding a soft light over upper and lower halls. Parlor is treated with white and gold in a dainty manner; bay window is fitted up with a paneled divan, and it has a spindle transom. Dining-room is trimmed with oak. It has a hardwood floor, paneled wainscoting and divan, and a buffet built in nook. Butler's pantry is well fitted up with bowl, drawers and dressers with glass doors. Lobby is large enough to overhanging roof, the soffit being paneled at its widest points. The frieze band, with crowning dentil course, is ornamented with papier mâché festoons and panels. The roof lines are well broken and relieved by a number of dormers, effectively treated, and eyebrow windows. The upper sash of windows are divided by wooden muntons, although some leaded glass has been used. Chimneys corbeled out, returned and capped with stone. Dimensions: Front, 40 ft. 6 in.; side, 41 ft. 6 in., including all projections, except veranda. Heights: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; attic, 8 ft. Underpinning of gray stone, black mortar joints. Structure above sheathed, papered and covered with clapboards, mitered at corners and painted gray. All above shingled, sides left to weather; roof stained green, blinds dark green; inside blinds have also been used. The plans show a convenient arrangement of rooms, wide, glazed entrance door opens on vestibule, hall has a paneled wainscot, exposed ceiling beams, wide stairs of easy rise, with ornamental newel and turned balusters, all in quartered oak. Reception room, in enameled white, has bay, full width, with seat and angle fireplace. Library, in California red wood, connects by sliding doors, and has bookcases, bay and angle fireplace, with mantel having plate mirror, supported by long Ionic columns. Sliding doors also to dining room, finished in the same wood, having



DESIGN FOR A HALL AND STAIRWAY.—From Moderne Innen Decoration.

nook, and it has a paneled wainscot. The butler's pantry is treated with the best fixtures, and dressers inclosed with glass doors. Kitchen is wainscoted, and trimmed with whitewood. It is fitted up with the usual fixtures. Den is conveniently located, and is finished in oak. The floors are of oak, and highly polished. The second floor is trimmed with whitewood, and finished natural. It contains four large bedrooms, dressing-room, closets and bathroom, the latter being wainscoted, and provided with the best improved fixtures and exposed plumbing. The third floor contains two bedrooms, servant's bedroom, and trunk room. Cemented cellar contains laundry, furnace, store-room, and other apartments. Mr. Oscar S. Teale, architect, 126 Liberty Street, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

"GRAYNOOK," A RESIDENCE AT SEASIDE PARK, CONN.

We publish on page 25 "Graynook," a residence recently erected for Dr. C. B. Baker, at Sea Side Park, Bridgeport, Conn. The engravings present a design most exquisitely executed, and it is put together with the best materials, in a most thorough, workmanlike manner. It has many unique features, including bay admit ice box. Kitchen is wainscoted with narrow beaded stuff, and provided with fireplace for range, sink and pantry. Rear hall is conveniently located, and it leads to cellar and to third floor. All these apartments are trimmed with whitewood. The second floor contains a large hall, four bedrooms, five closets, dressing room, linen closet and bathroom, while the third story contains two bedrooms, trunk room and ample storage, all trimmed with whitewood and finished natural. Bathroom wainscoted, and fitted up with exposed plumbing complete. Cemented cellar contains laundry, furnace and other apartments. Mr. Warren R. Briggs, architect, Bridgeport, Conn.

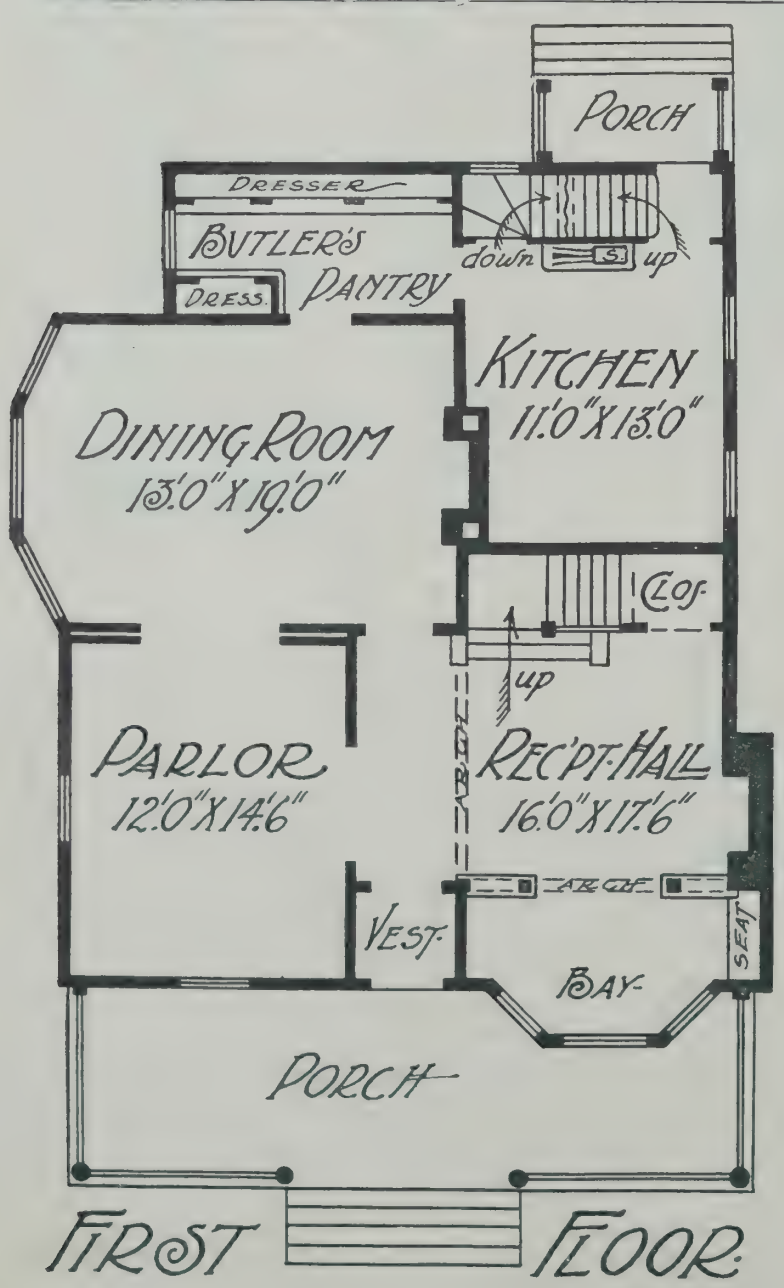
Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

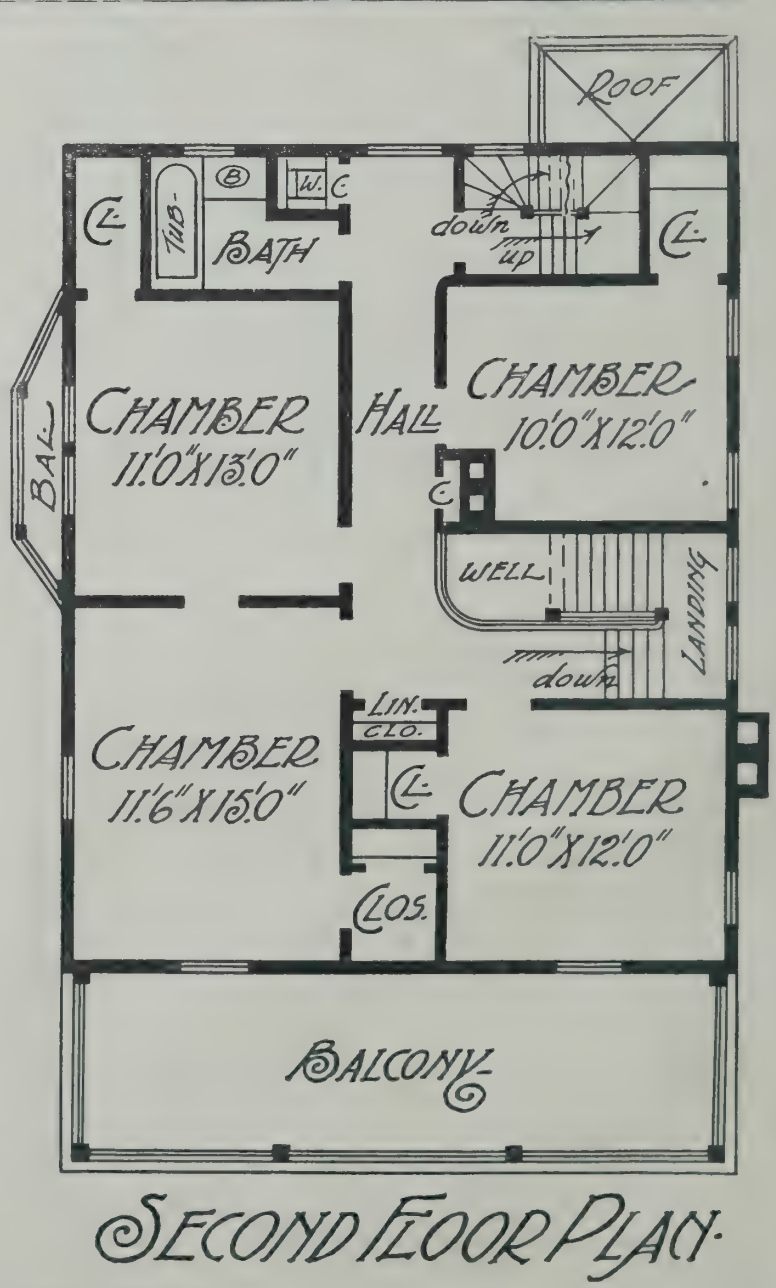
A RESIDENCE AT CHESTER HILL, MOUNT VERNON, N. Y.

Our views and floor plans on pages 26 and 27 illustrate the interesting residence of E. J. Wathew, Esq., on Chester Hill, Mount Vernon, N. Y. Designs are picturesquely treated, detail being in the Colonial style. House has a 10 ft. veranda, running to bays at front and side, with stone piers supporting the roof above; also, two fluted columns at entrance, stone cheeks at steps. There are frequent bays, kept, however, within the line of the seat in bay effect, and recess for buffet. Butler's pantry, with sink and dressers, is means of communication with kitchen, provided with the usual fixtures and back stairs. Den, also trimmed in hardwood, has angle closet and fireplace. The second floor is divided into five chambers, all with closets, two with fireplaces, and the bathroom, having exposed plumbing and fixtures of good make. Attic has two servants' and billiard rooms, finished off, as well as storage space. Cellar, cemented, contains laundry, cold room, fuel bins and hot air heater; also toilet. The stable plan shows a good sized carriage house, with harness closet under stairs leading to floor above, which has man's room, finished off, and large hay loft. There are four stalls, one being box and another for cow. Dimensions: Front, 32 ft. 6 in.; side, 21 ft. Heights: First story, 10 ft.; room above, 8 ft.; exterior finish same as house, interior in North Carolina pine. Louis Herbert Lucas, Esq., architect, 487 Fifth Avenue, New York City.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

Buildings 24 stories high are now projected in New York City. This beats the Tower of Babel.





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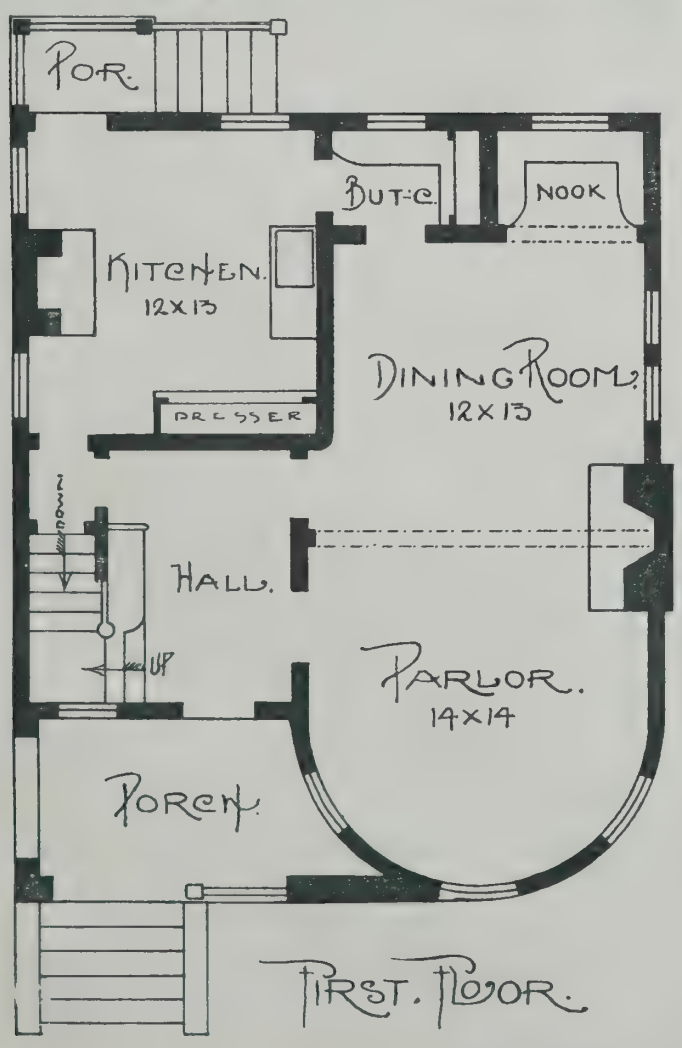
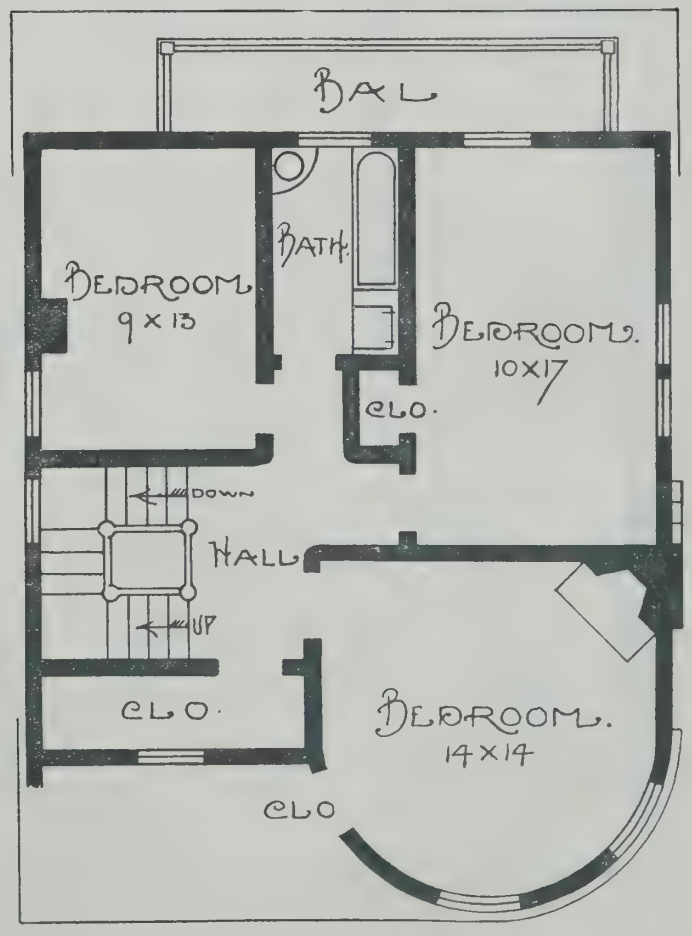
A DWELLING AT SCRANTON, PA.—See page 18.





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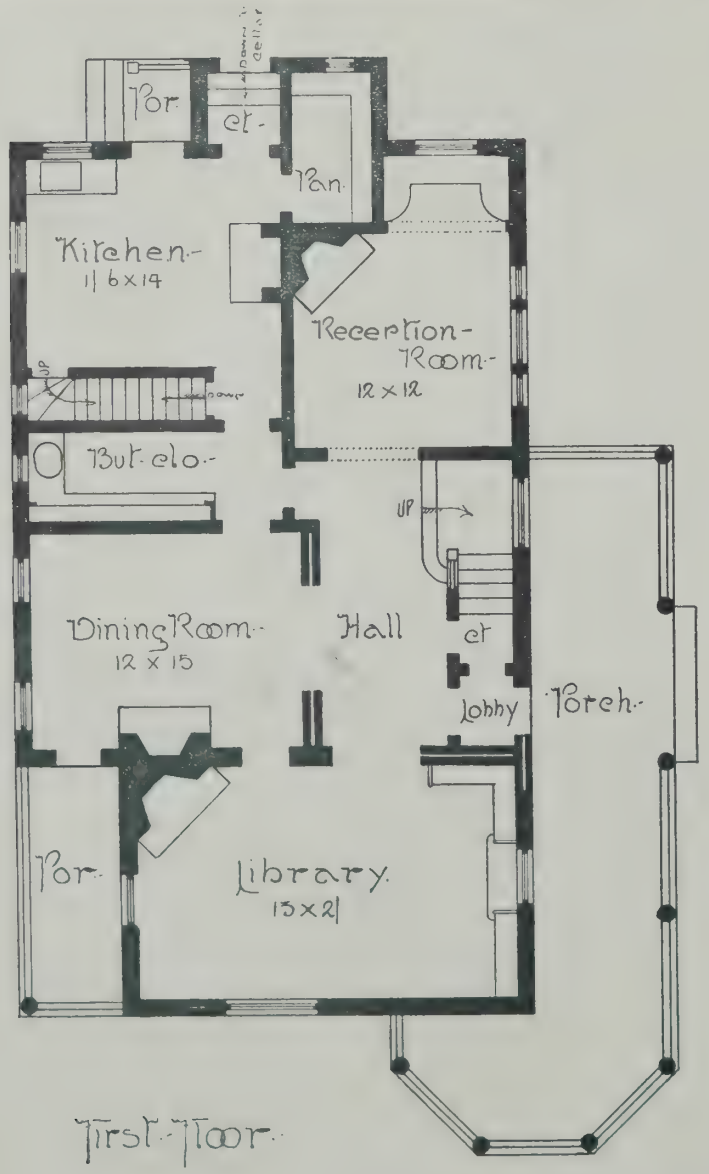
A COTTAGE AT RESIDENCE PARK, NEW ROCHELLE, N. Y.—See page 18.



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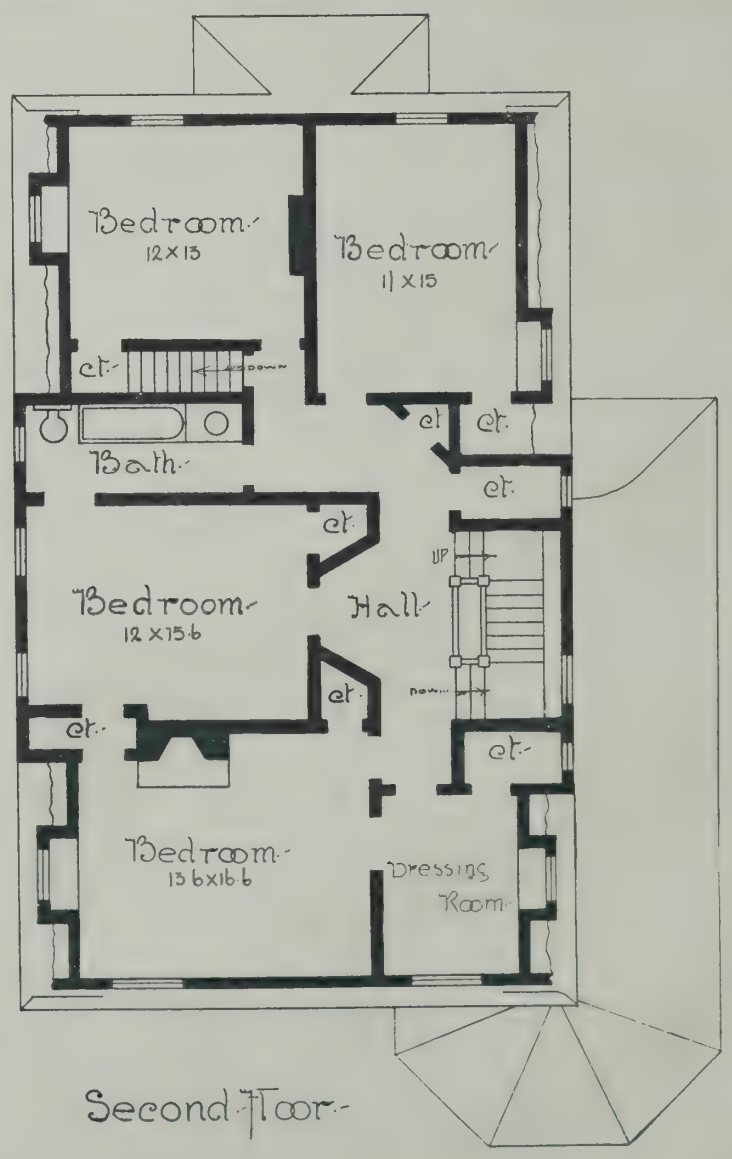

Second Floor.

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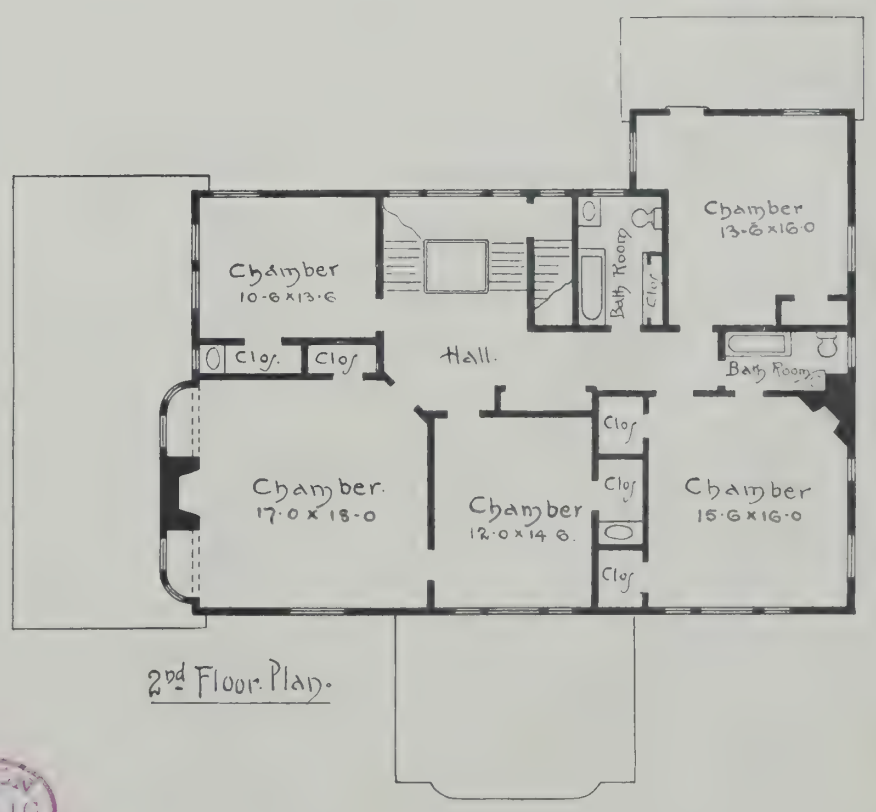
A COTTAGE AT SOUTH ORANGE, N. J.—See page 18.



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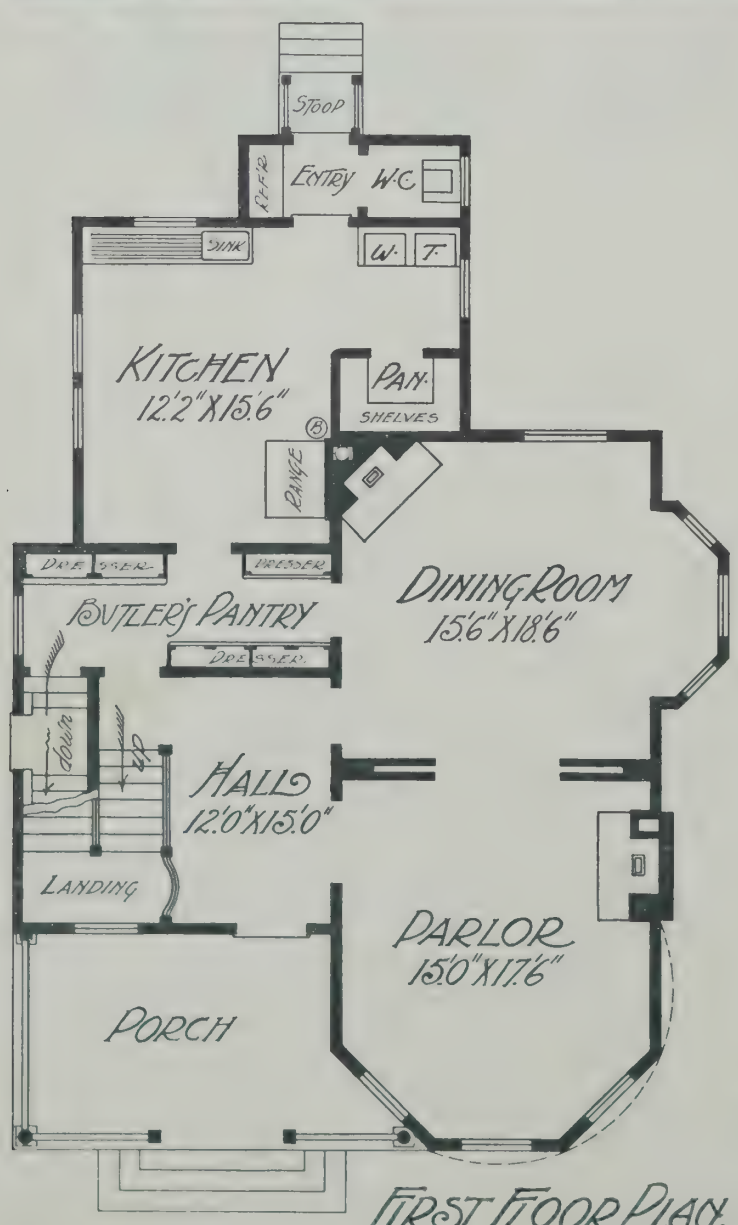
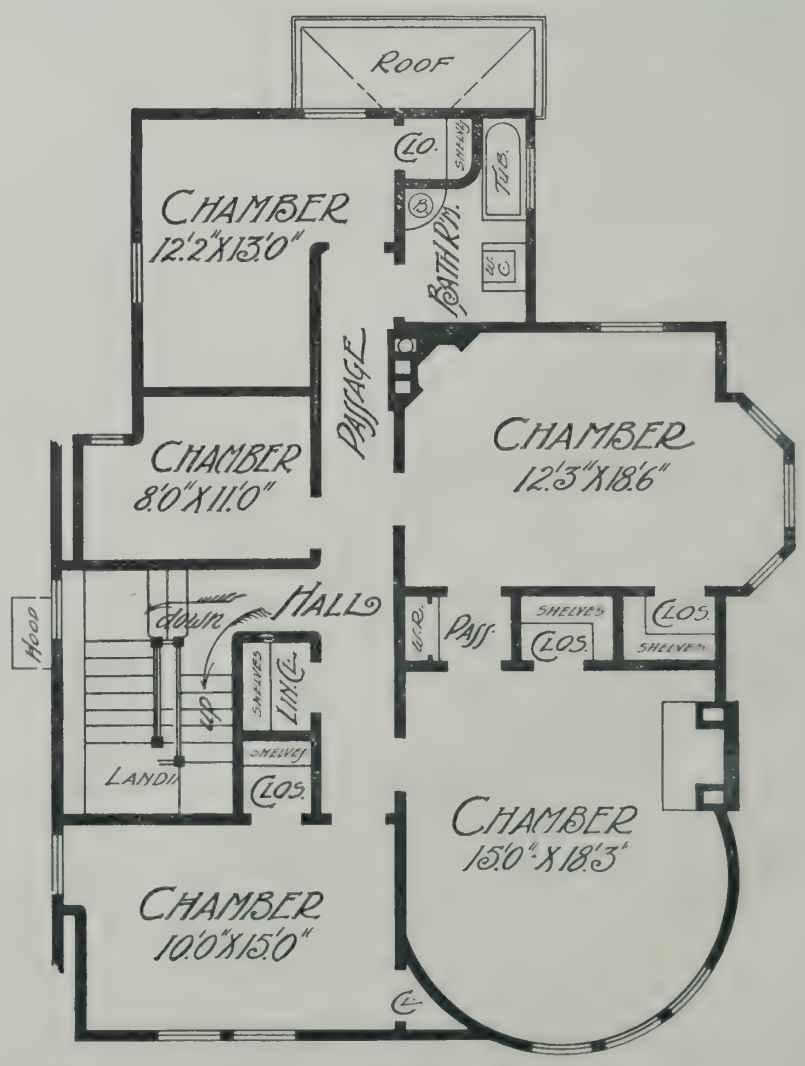
A HOUSE AT SUMMIT, N. J.—See page 18.



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

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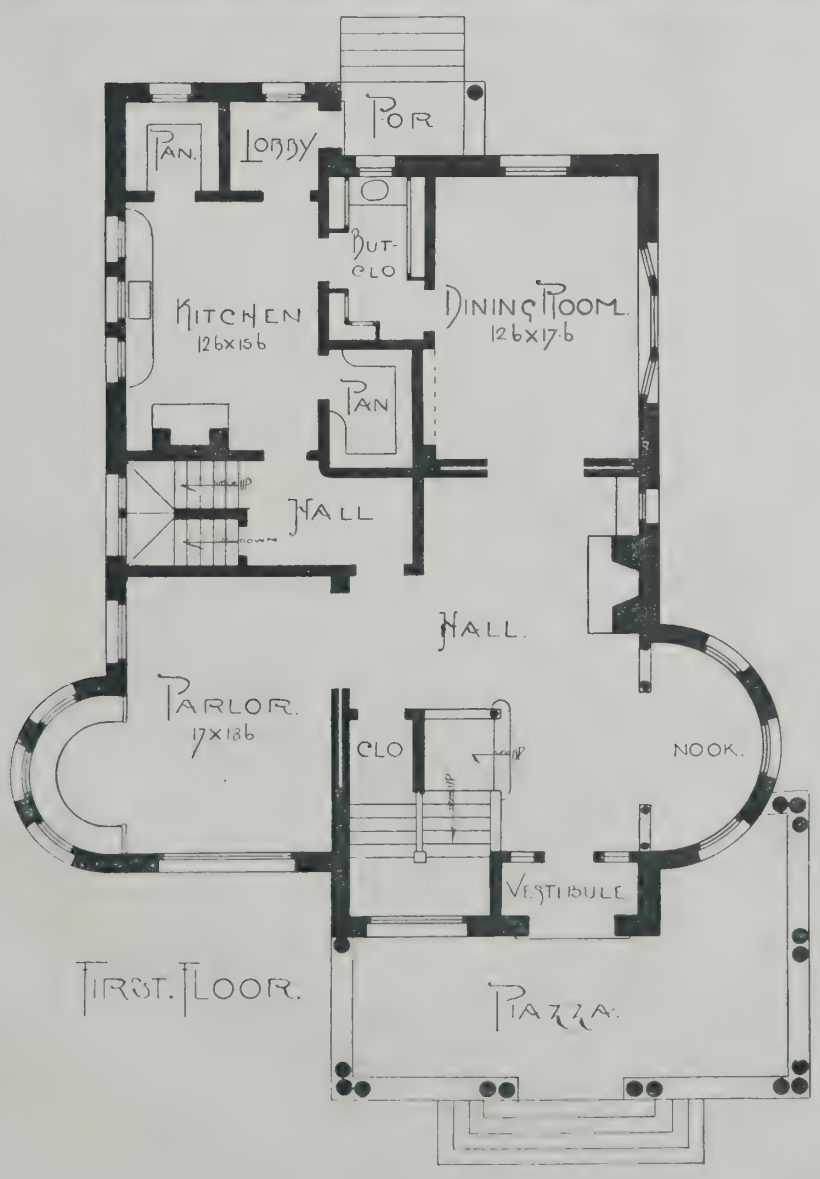
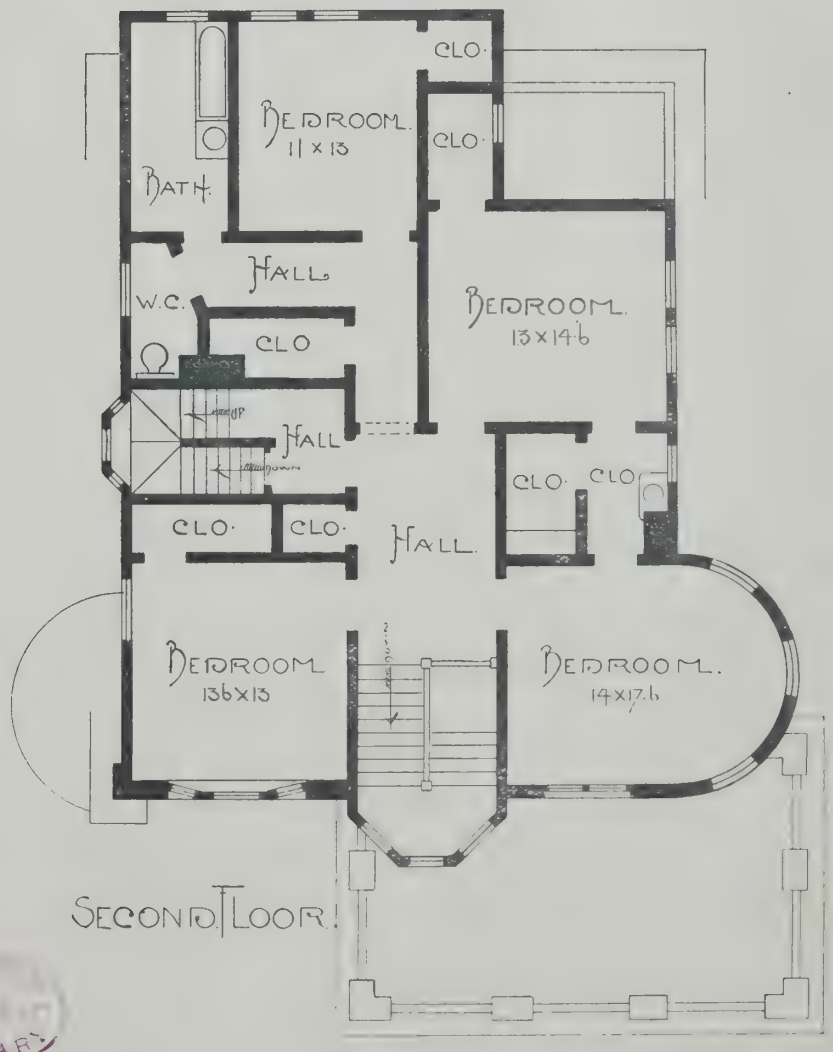
A COTTAGE IN THE SUBURBS OF BROOKLYN, N. Y.—See page 18.





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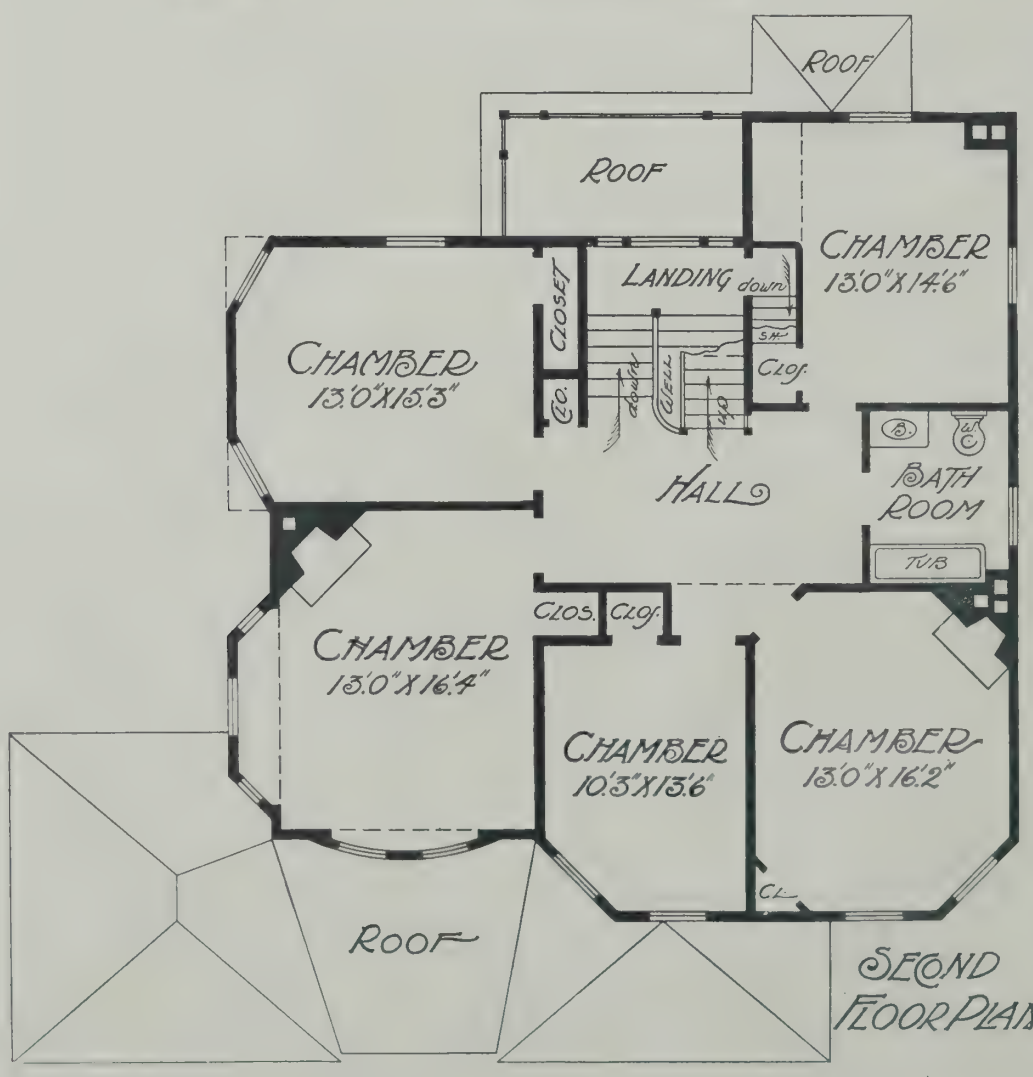
"GRAYNOOK," A RESIDENCE AT SEASIDE PARK, CONN.—See page 19.



A RESIDENCE AT CHESTER HILL, MOUNT VERNON, N. Y.—See page 19.

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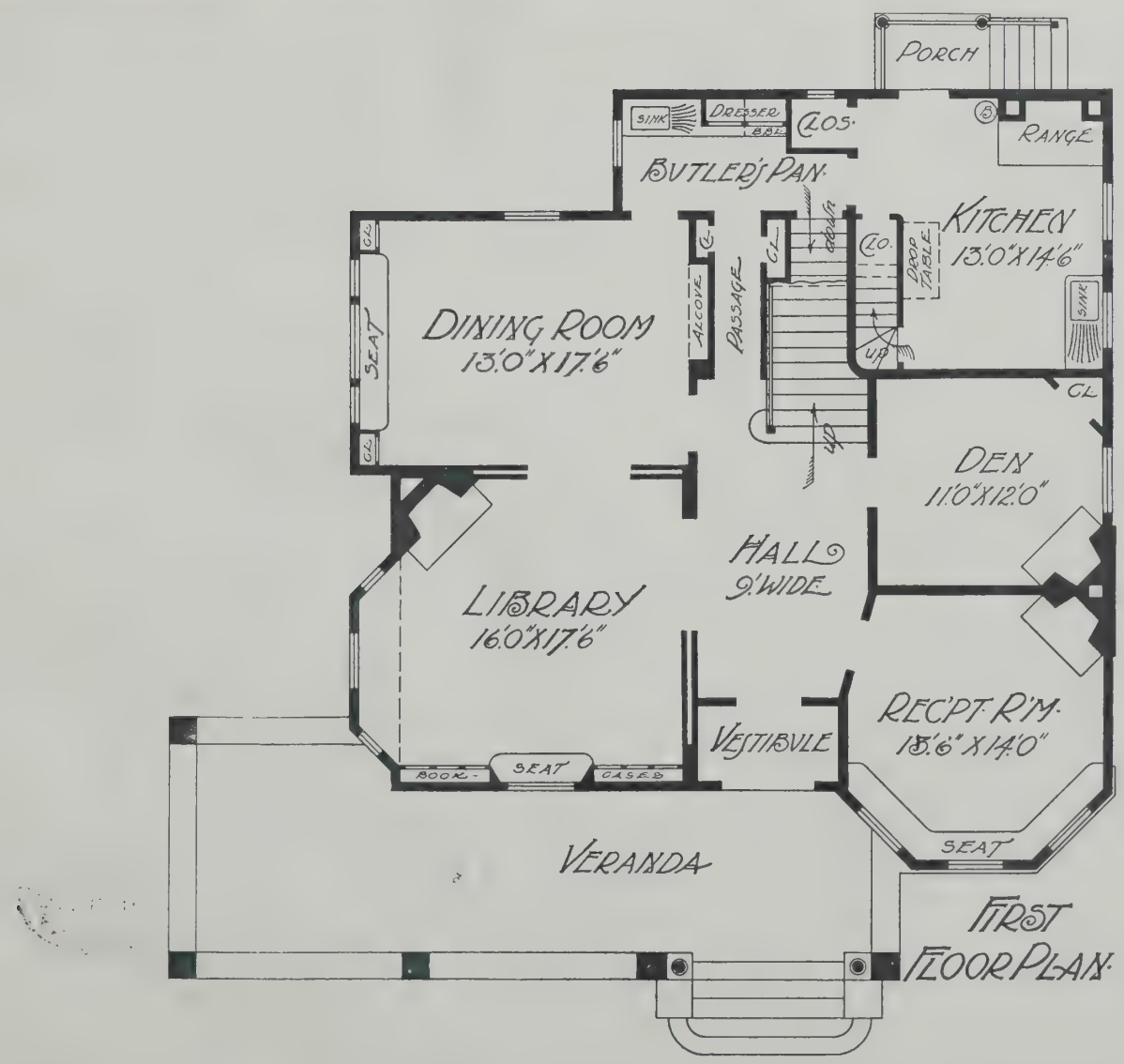

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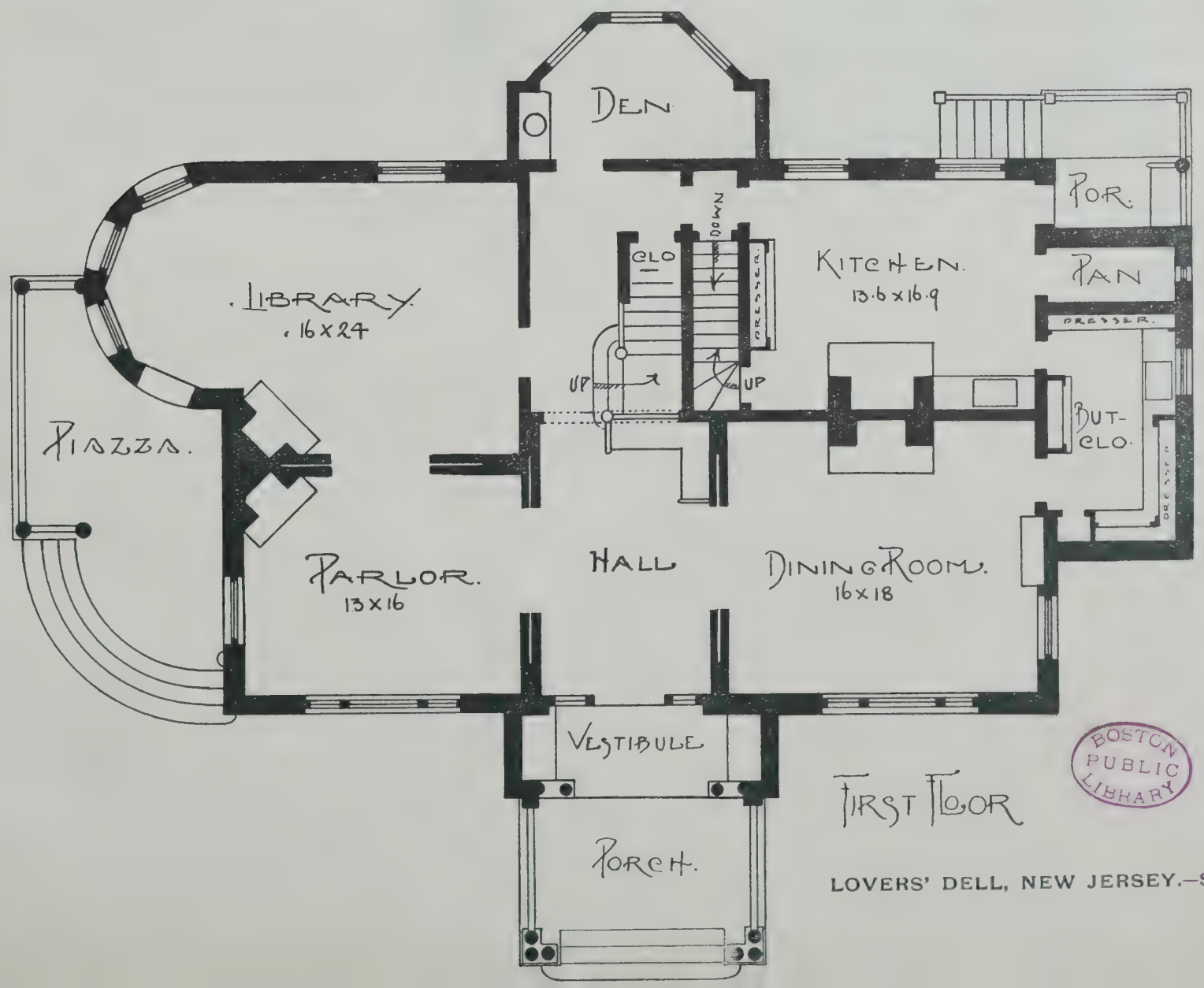
A RESIDENCE AT CHESTER HILL, MOUNT VERNON, N. Y.—See page 19.

LOVERS' DELL, NEW JERSEY.—See page 19.



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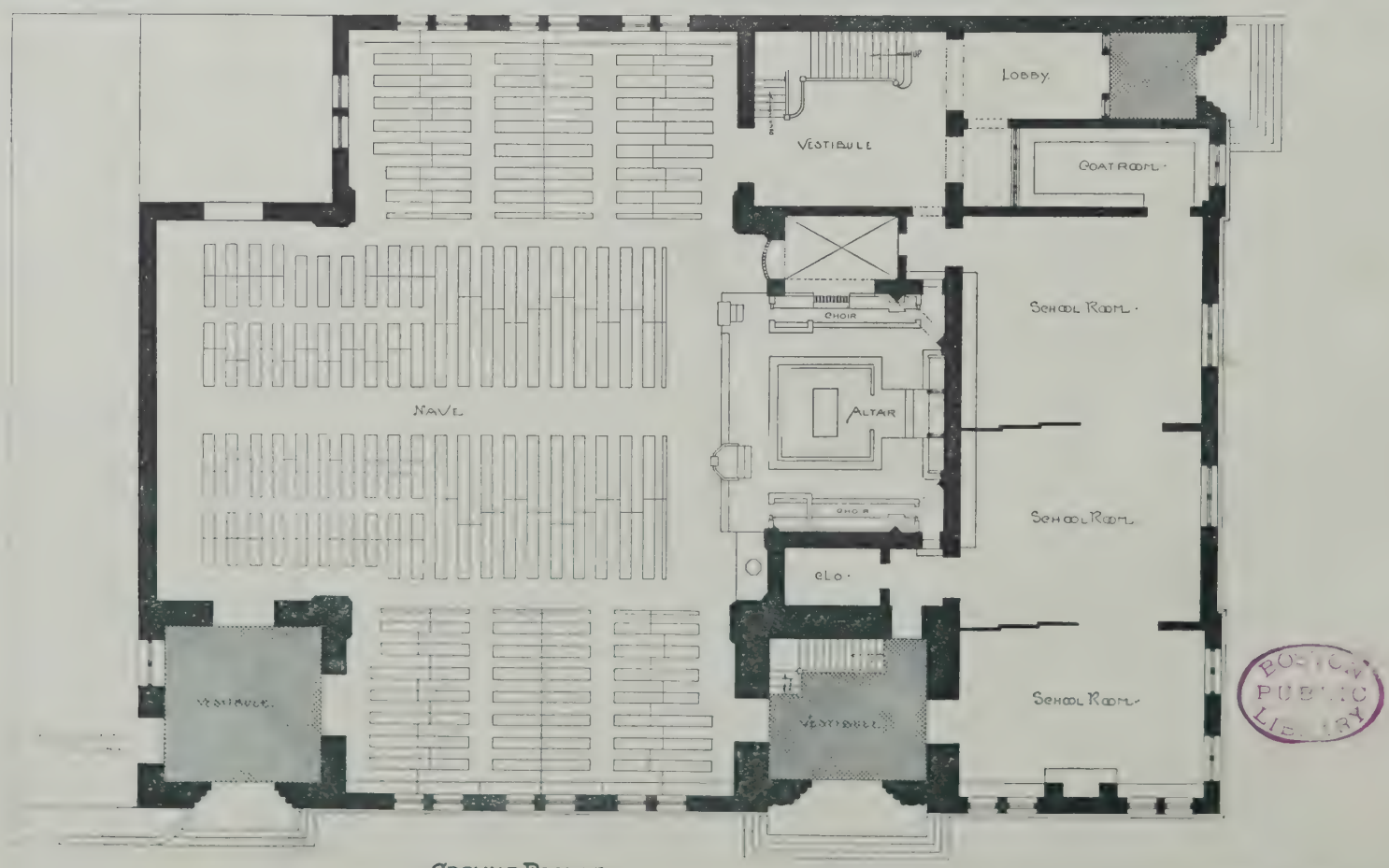
LOVERS' DELL, NEW JERSEY.—See page 19.



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GROUND PLAN OF HOLY TRINITY CHURCH NEW YORK

HOLY TRINITY CHURCH, NEW YORK.—See page 29.

HOLY TRINITY CHURCH.

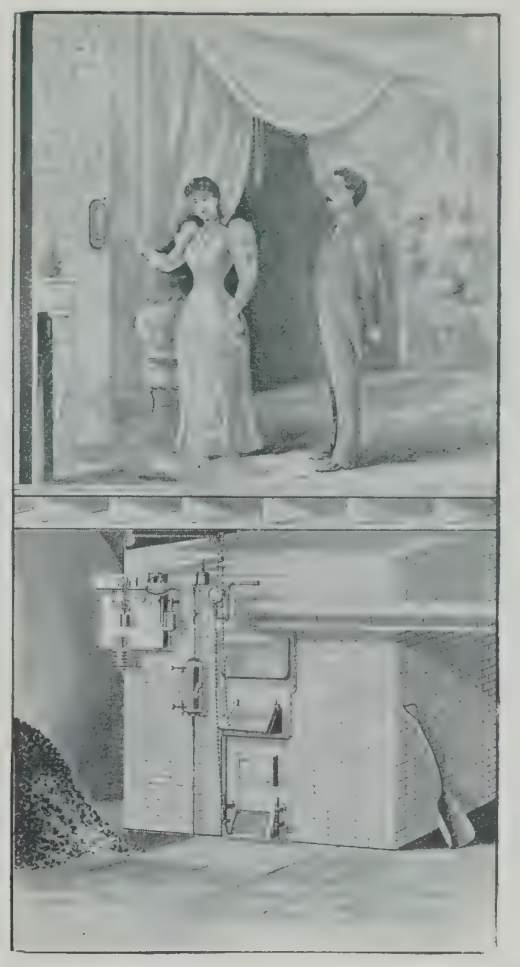
We publish on page 30 a ground plan and a perspective view of Holy Trinity Church, Harlem, New York. The site faces one hundred and fifty feet on One Hundred and Twenty-second Street, and one hundred feet on Lenox Avenue. Though the dimensions are considerable, they can hardly be called ample for a scheme which combines a church, rectory and a large parish building. It is evident that there were many conflicting considerations, both architectural and practical, in disposing these upon such a plot, but the result is a plan showing the parish building on the outer angle, and the rectory the inner, flanking the church, the axis of which becomes the shorter dimension of the site, although the nave runs east and west, and the street gable is that of a transept. The front of the church is separated from its dependencies on one side by a deep and powerful round arch in a low wall, forming a subordinate entrance, while the main entrance, a corresponding arch on the other side, is pierced through the base of the massive square tower which crowns the edifice, and forms with the gables of the nave and the transepts, and with the lower roof upon the avenue side, an effective and harmonious architectural composition. The building is treated in the Romanesque style of architecture, and is constructed of an effective combination of rough-faced red granite for the main wall, with a rich brown sandstone for the trimmings. The roofs are covered with red English tiling. The triplet of round arches, with the central one raised, is frequently repeated with excellent effect, while in the gables that flank the avenue front it becomes a novel feature, the central opening being narrowed to a mere slit, and divided by the moulded impost of the lateral arches, which serves as a lintel to the lower part, while the upper is continued for a full stage, with deep shafted jambs, and closed with a round arch that effectually relieves the gable wall of monotony. The low avenue wall is an admirable piece of masonry. The openings of the first story are plain, double-linteled openings. In the curtain wall, two triplets of round arches, with short and sturdy supports, are disposed over the square-headed openings of the first story, while at the centre of the ridge of the roof above them is placed a polygonal lantern, that not merely animates the expanse of roof, but groups very picturesquely with the gable of the nave, and with the great tower that rises behind and above it. The tower is, perhaps, the most successful feature. Its base is in the plane of the wall, from which it is detached only by a change of material, its lines being brought down to the ground in brownstone. Above the entrance arch, and the two string courses just described, a pediment of which the sides are prolonged to the lower, and of which the peak dies into the central shafts of the belfry opening above, the steeply sloping offsets at its base. The dropping of this belfry opening on the street front is one of the best points of design in the whole building, giving the utmost possible value to the long and heavily moulded openings of the tower. The main vestibules have tiled brick floors, and paneled oak walls and ceiling, with the exception of main vestibule wall, which is built of stone. The interior of the church is quite as successful as the exterior, and has much more of the interest of novelty, because it comes not with an attempt to do something new, but from the effort to meet requirements. The plan is in the shape of a cross with very short arms, a transept crossing, in fact, with a bay at each end. The central space is a square of fifty feet, and the covering naturally suggested by such a space is a groined vault. The vault is plastered with effectively moulded arches and ribs, while the ceiling of each transept is a tunnel vault. With such a scheme, the introduction of galleries connecting the piers of the vault is provided. The chancel is a five-sided apse, covered with a half dome, and with no light, except what it receives from an opening, itself invisible, on each side, just under the spring of the dome. The wall of the apse is wainscoted in African marble, with oak paneling over, and is divided at about half its height by a carved balustrade. The impressiveness the apse derives from its form and proportions, and from the skillful device of its lighting, is enhanced by the decoration, which is deep in tone and of a sombre richness. The body of the church is fitted and pewed plainly and solidly in oak, while there is no more delicate wood carving to be seen anywhere than that which adorns the bishop's throne, the communion table, and the other furniture of the chancel. The seating capacity is twelve hundred. The parlors and Sunday school rooms on both first and second floors are well arranged. The basement contains the heating apartment, kitchen, pantries, etc. A novel feature is the gymnasium, which is also fitted up complete in the basement. The rectory contains ten rooms, and is handsomely trimmed and fitted up complete. Mr. William A. Potter, 160 Fifth Avenue, New York, was the architect.

Our engraving was made direct from a photograph of the building, taken specially for the Scientific American.

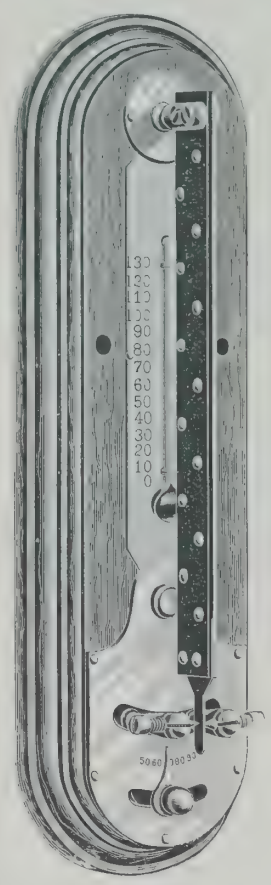
The average speed made on the recent 1000 mile relay bicycle race, Chicago to New York, was 15⅓ miles per hour. Michael, a young Englishmen, on May 19, at Paris, made 100 miles in 4h. 2m. 45⅘ sec.

THE WATERBURY ELECTRIC HEAT REGULATOR.

This is a device for the regulation of heat in dwellings and offices. Its action is electrically automatic. It consists of a motor on a train of gear wheels, attached to the heating apparatus in the cellar, and a thermostat in the apartments above, an electric connection with the motor being made by the expansion and contraction of the thermostat bar. Our illustrations represent the manner in which the regulator works, the thermostat being shown in a separate figure. When the electric circuit is made by the expansion or contraction of the thermostat, the armature of the motor is attracted to the magnet coil, and raises the lever and releases the motor, opening the draught and closing the check draught on the heating apparatus, or *vice versâ*, as the rooms above become cold or hot. The power for operating the motor is furnished by a winding barrel, with a double cord and pulley, and the necessary weight attached.



THE WATERBURY ELECTRIC HEAT REGULATOR.



THE THERMOSTAT.

The thermostat is finished to correspond with the room in which it is located, and consists of a base, ten inches long, made of hardwood, on which is a metal plate with the different degrees of temperature stamped thereon. The pointer can be moved to any degree of temperature desired. When the temperature of the room where the thermostat is located attains the desired degree as indicated by the thermometer and the pointer, the unequal expansion of the thermostat bar causes it to make contact with a contact post, thereby causing the electric current to release the motor, and closes the draught and opens the check draught, stopping or checking the fire. As the temperature in the room becomes a degree lower or cooler, the contraction of the bar causes it to make contact with another contact post, thereby causing the electric current to release the motor again, and open the draught and close the check draught, allowing the fire to burn. The result is that, as the regulator operates with a change of one degree of temperature, the room or office is kept at a uniform temperature day and night, entirely removing the danger of fire, caused by forgetting to close the draughts of the heating apparatus. It is a labor saving invention as it is entirely unnecessary to go to the cellar to change the draughts, this being done automatically, and the fireman's duty simply being to put coal in the firebox and remove the ashes. It is economical, as it saves fuel by keeping a steady fire, and is equally useful on hot water, steam, or hot air furnaces. It has been thoroughly tested by practical use, and it is manufactured by The Specialty Manufacturing Company, Watertown, Conn.

There are over seven miles of tunnels cut in the solid rock of Gibraltar.

Finishing Floors.

It has been found by those thoroughly acquainted with the finishing of floors, that one of the best finishes for the preservation of the natural beauty of the woods, for cleanliness and ease of application, is the wax finish. This is easily kept in beautiful condition by the use of a weighted brush once or twice a week, and the application of wax on worn spots when necessary. Not like shellac or varnish, it can be applied in spots where needed, it not being necessary to go over the entire surface. Johnson's prepared wax is especially prepared for use on floors, and is one of the best finishes of its kind on the market. It spreads out readily, gives a high polish with little work, and is easily kept in perfect condition. It can be purchased from any reliable paint and oil dealer. Write for "What People Should Know About Finishing Hardwood Floors" to S. C. Johnson, Racine, Wis.

A Pompeian Bathroom.

The richest and most complete bath yet found in the ruins of Pompeii has recently been discovered. It is a large building, with sculptured basins, heating apparatus, lead pipes, and bronze faucets. The walls and floor are tiled. Everything is in an almost perfect state of preservation, owing to the roof having remained intact when the city was buried in the year 79.

The Seasoning of Stone.

Stone, like lumber, requires seasoning. Stone is often spoken of as the synonym of solidity—"as solid as a rock," we say, but, as a matter of fact, stone is very far from being solid. A cubic foot of the most compact granite, for instance, weighs about 164 pounds, while a cubic foot of iron weighs 464 pounds. This plainly shows that, in between the atoms which compose the mass of the most enduring stone, there exists much space for air, moisture, etc. This seasoning of stone prior to use for building purposes has been well understood by the architects of all ages, but in the modern rush of nineteenth century building too little attention has been paid to it. Now it enters into the calculations of every good architect.

Experiments are being made in the German army with the use of an aluminum pontoon. It can easily be carried by four men.

The highest temperature in the world is recorded in the great desert of Africa, where the thermometer often marks 150 degrees Fahrenheit.

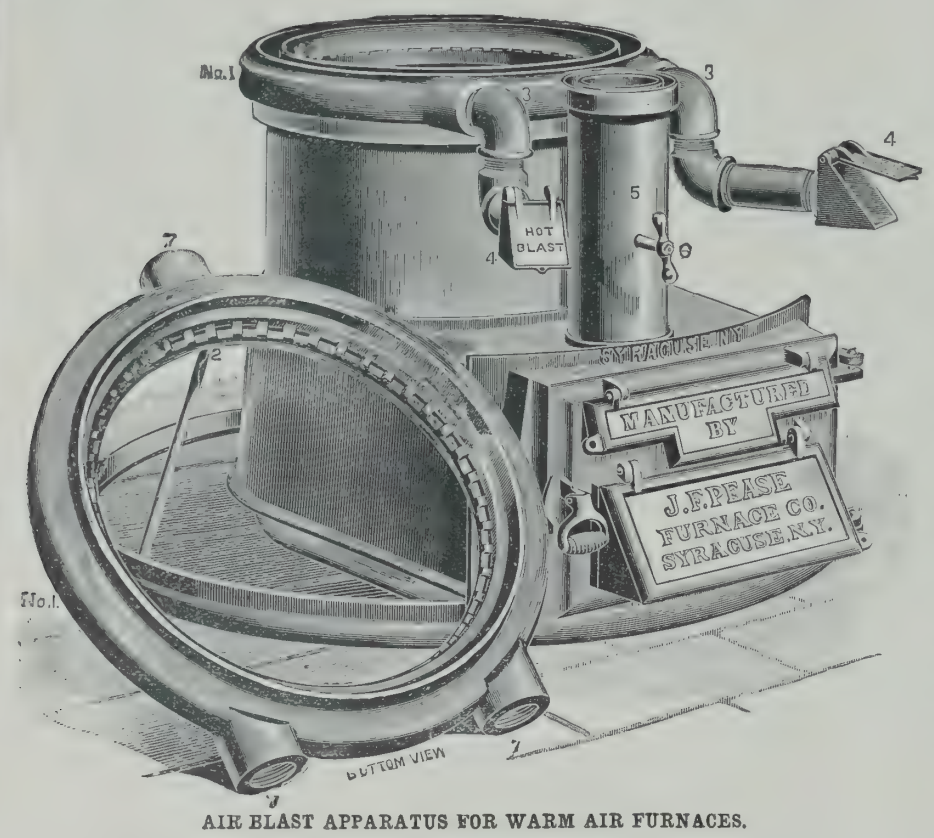
A SANITARY BATHTUB.

The body or shell of this tub is of solid planished copper, tinned on the inside, and heavy enough to more than stand the weight of any one using it. It is shellacked on the outside, to prevent tarnishing, and may be painted or decorated to suit the most elegant bathrooms. It has nickelplated connecting waste and overflow. This tub is made in regular, French and Roman patterns, with the very best of workmanship in every detail, by Mr. R. M. Wilson, of Rome, N. Y., who is one of the largest manufacturers in the country of every description of plumbers' copperware. As will be seen by the illustration, the tub forms an exposed or openwork fixture, having much to recommend it in appearance and cleanliness.

THE WILSON SOLID COPPER SANITARY BATHTUB.

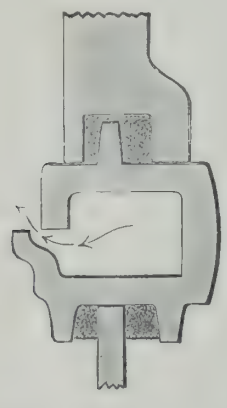
IMPROVEMENTS IN WARM AIR FURNACES.

The apparatus represented herewith is designed to promote effectual and complete combustion, by supplying to the fire an extra quantity of heated air, delivered immediately over the surface of the fuel, from a hollow ring which fits into a cup joint on top of the fire pot, and which has a cup joint on its top, in which the

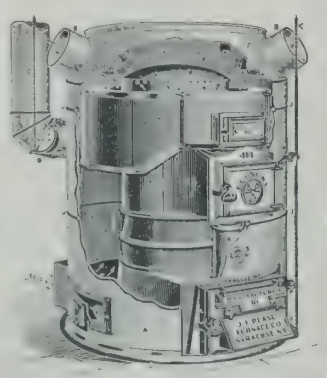


AIR BLAST APPARATUS FOR WARM AIR FURNACES.

combustion chamber rests. No. 1 in the engraving shows the ring detached and in place. The air is drawn into the ring through three supply pipes, two in front and one in the rear, the front chutes having regulating doors for adjustment according to the varying conditions of the draught. The rear in-take pipe runs down the back of the fire pot, and is always open. The air, in passing through the supply pipes and through the ring, becomes heated before it is delivered on the surface of the fire. The distribution from the ring, of which the annexed figure is a sectional view, is through horizontal slots, the outlet area of all the slots being less than that of the in-take pipes, so that every slot will be continuously active. The slots are protected by a canopy from becoming clogged with small particles of fuel, and the pipe connections and fittings can be easily put together without any other tools than an ordinary wrench.



This apparatus has been perfected and is being introduced by the J. F. Pease Furnace Co., of Syracuse, N. Y., and is especially designed for use on all furnaces burning soft coals, where the escape of considerable quantities of smoke from the chimney always bears witness to the fact that the combustion is incomplete, thus showing that the furnace is wasteful, while in all cities the escape of smoke is highly objectionable. These rings are provided for a variety of furnaces made by the company, and can be introduced in old furnaces at a small cost.



PEASE "ECONOMY" FURNACE.

The small view herewith represents the 1895 pattern of the "Economy" furnace, made by the J. F. Pease Company, a furnace designed especially for erection in low cellars, and adapted to burn hard or soft coal or coke. The sectional air blast is fitted in this furnace inside the combustion chamber. Great care is taken to make this furnace absolutely gas tight, and to prevent the escape of any impurities and odors of combustion into the air chamber.

The Alteneder drawing instruments, manufactured by Theo. Alteneder & Sons, of Philadelphia, have a world-wide reputation as being among the very best instruments made. Each instrument is stamped with the firm name or trademark, which has come to be known in the profession as the best of guarantees as to its excellence in form, proportion, material, construction and finish. The 1895 catalogue, just issued, affords an excellent exhibit of these instruments. It is sent to any address on receipt of four cents in stamps to pay postage.

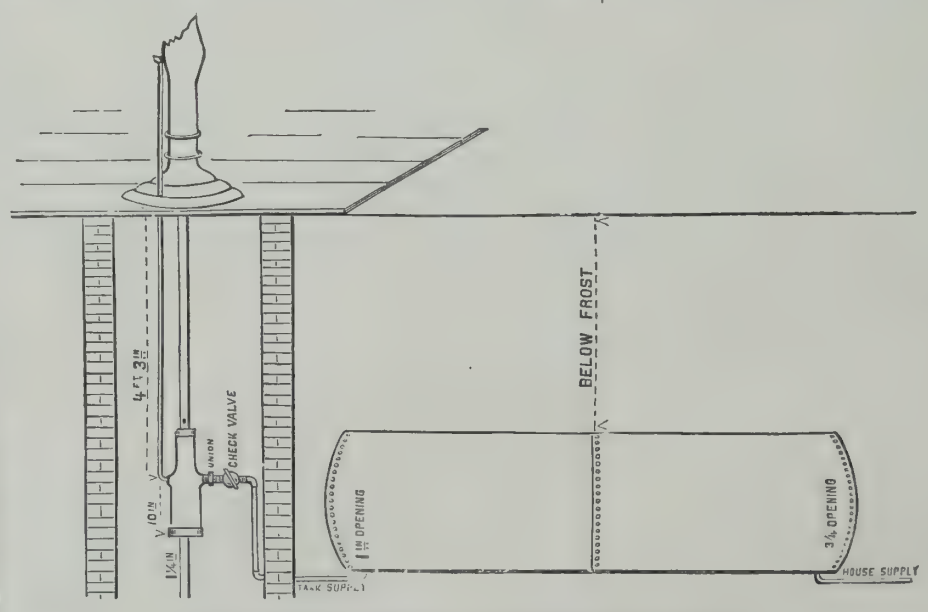
The raw silk machinery wipers, made by the American Silk Mfg. Co., of 313 Walnut Street, Philadelphia, have, in the course of the last five years, become very popular with all users of machinery. They are made of raw silk waste, and are far superior to the ordinary cotton waste wipers in that they leave no particles of lint on the parts wiped, and do their work much more quickly and effectually. Their endurance is so much greater than the cotton waste wipers that they are also more economical in the end than the inferior wipers.

The high grade varnishes and the Paradox enamel colors made by Felton, Rau & Sibley, of Philadelphia, are well adapted for giving the most exquisitely beautiful finish on all the interior work of a house. The samples of the work of this firm in filling and finishing in all kinds of hard and fancy woods are probably not to be excelled anywhere, and are well worth the attention of all painters and house decorators. Their enamel colors are especially adapted for bathtubs, furniture, interior decorations, etc.

Country Homes having a Mason & Hamlin organ as one of the elements of their attractiveness have at hand the means of making exceedingly pleasant many hours when the weather does not favor out of door rambling or other kinds of diversion. An organ or a piano fills a place as a means of entertainment which nothing else can supply, and the instruments made by the Mason & Hamlin Co., of Boston, have a reputation which, of itself, affords a guarantee of their excellence. Their grand and upright pianos and their Liszt organs are standard instruments everywhere.

AN IMPROVED DOMESTIC WATER SERVICE SYSTEM.

The illustration represents the operation of a system of water service designed to meet the wants of country, village, and suburban homes, or for use wherever water mains are not accessible. It is manufactured by Messrs.

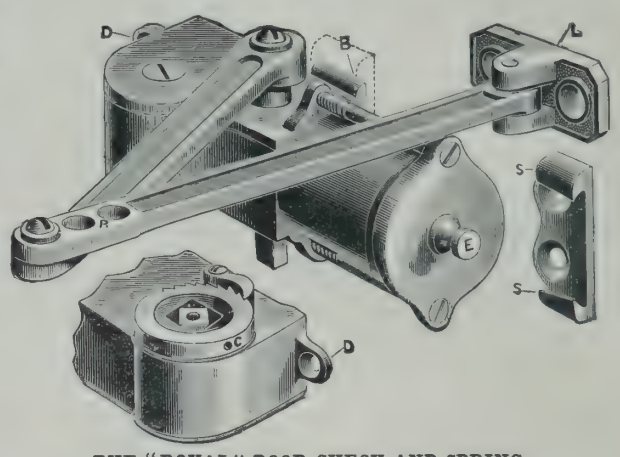


THE KIRTLEY DOMESTIC WATER SERVICE SYSTEM.

Kirtley Brothers, sanitary and contracting engineers, No. 1213 Walnut Street, Kansas City, Mo., who have had five years' experience with the system, and report it to be steadily growing in favor. It proceeds upon the plan of lifting the water from cistern, well or spring, and forcing it into an underground tank against the air, thus compressing the air, and creating a pressure upon the water sufficient to send it to any part of the house or grounds. The tanks are of wrought steel, and, there being no escape of the air as the tank is being filled with water by the action of the pump, sufficient pressure is thus put upon the water to enable it to be used in the same way as water from the pipes of a water supply system, in the ordinary house fixtures; for sprinkling with a hose, etc. Tanks of six, eight, ten or twenty barrels capacity are recommended and used, and a pressure of fifty pounds may be carried all the time by pumping a little every morning. The tanks are located sufficiently below the frost line to keep the water at an even temperature in all seasons.

AN IMPROVED DOOR CHECK AND SPRING.

The device shown in the illustration has a compressed air check, and, consequently, has no liquids to freeze up or leak, so that it is hardly possible for it to get out of order. It does not require a skilled mechanic to put it in place, and it will fit right or left hand doors. It is being put on the market by Messrs. W. H. Quinn & Co., 105 Chambers Street, New York. In attaching the device, the shoe (S) is placed in upright position on the door,



THE "ROYAL" DOOR CHECK AND SPRING.

about six inches from the back and flush with the top, then slide the check into the shoe until the lugs (B) fit solid, and screw in end screw (D). The support of arm (L) is put in place, and the arm brought to position, when the spring is adjusted. The thumb screw (E) regulates the air check. If the spring is weak, its tension is increased by turning up the ratchet wheel (C). If the transom rail has a raised moulding, the arm (R) is shortened by placing its outer pivot in a different hole. Doors fitted with this device open easily and without back suction, and the device is compact, strong and durable.

The Wood of Most Uses.

Theoretically speaking, says Timber, of London, Eng., the oak is the wood which can be put to the greatest variety of uses, but, as a matter of fact, the pine is most used, on account of its abundance. The timber of the oak, which combines in itself the essential elements of strength and durability, hardness and elasticity, in a degree which no other tree can boast, has been used for shipbuilding since the time of King Alfred. It is also employed in architecture, cabinetmaking, carving, mill work, coopering, and a thousand and one other ways, while the bark is of great value as furnishing tan and yielding a bitter extract in continual demand for medicinal purposes.

The timber of the pine is also used in house and ship carpentry. Common turpentine is extracted from it, and much tar, pitch, resin and lampblack. Splinters of the resinous roots serve the Highlanders instead of candles. Fishermen make ropes of the inner bark which the Kamchatdales and Laplanders steep in water and utilize for making a coarse kind of bread. The oil obtained from the shoots of the dwarf pine is a kind of universal medicine among the peasants of Hungary, while the soft-grained silver fir is in much requisition for the sounding boards of musical instruments, and the Germans employ it almost exclusively in their vast toy factories. In the manufacture of lucifer matches, and, above all, paper pulp, thousands and tens of thousands of acres of pine forests are cut down every year.

A HOLLOW HANDLE GLASS CUTTER.

The extra cutters and pins convenient for use with a glass cutter may be stored in the handle of the tool shown in the illustration. The handle is made from cocobolo, handsomely polished, and the metal head is nickelplated. The cutter wheels are of the finest steel, and the post in which the wheel runs is of hardened steel.

A HOLLOW HANDLE ADJUSTABLE GLASS CUTTER.

The handle contains twelve cutter wheels and three arbor pins. This tool is manufactured by the Millers Falls Co., 93 Reade Street, New York City, and every part of the tool, except the wheels and arbor pins, which may be readily replaced, is designed to last a lifetime.

SCIENTIFIC AMERICAN

Building Edition.

ESTABLISHED 1884. [Entered at the Post Office of New York, N. Y., as Second Class matter. Copyright, 1895, by Munn & Co.] PUBLISHED MONTHLY.

Vol. XX. No. 3 NEW YORK, SEPTEMBER, 1895. Subscription, $2.50 a Year. Single Copies, 25 Cents.

BOSTON PUBLIC LIBRARY

A RESIDENCE AT EDGEWATER, CHICAGO, ILL.—See page 34.

Scientific American.

ESTABLISHED 1845.

MUNN & Co., Editors and Proprietors,

No. 361 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

NEW YORK, SEPTEMBER, 1895.

THE

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A RESIDENCE AT EDGEWATER, CHICAGO, ILL.

We present on pages 33 and 41 photos and plans of a residence erected for B. C. Rogers, Esq., at Edgewater, Chicago, Ill. The engravings show a pleasing design, with many good features. The underpinning, first story and chimney are built of cut stone, with faces left rough as they come from the quarry. The second story is built of wood, with the exterior walls covered with shingles, and stained a mahogany color. The roof is shingled, and painted red. Dimensions: Front, 37 ft.; side, 52 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft., third, 8 ft. 6 in. Vestibule is paneled with oak, and it has a paved floor of tiles. The hall is trimmed with oak, and it has an ornamental staircase, with carved newels, and is lighted by stained glass windows. The library is trimmed with sycamore, parlor with cherry, and dining-room with oak. Each apartment is provided with an open fireplace, furnished with tiles, and hardwood mantels of excellent design, to correspond with the trim of each room respectively. Kitchen and pantries are trimmed and wainscoted with whitewood, and are furnished with the usual fixtures complete. The second floor is trimmed with sycamore, and it contains four bedrooms, closets, large, open hall, and bathroom. Bathroom is wainscoted, and fitted up complete with the best modern fixtures and exposed plumbing. Two bedrooms and ample storage on third floor. Cemented cellar contains furnace, laundry, and other necessary apartments. Mr. J. L. Silsbee, architect, Lakeside Building, Chicago, Ill.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

RESIDENCE IN TENNIS COURT, FLATBUSH, L. I.

We present on pages 35 and 38 the residence of C. H. Fuller, Esq., at No. 2 Tennis Court, Flatbush, L. I. The exterior view shows a well proportioned and interesting design in the Colonial style. There is a broad, well shaded veranda, with balcony above, supported by Tuscan columns of good detail; railing, with turned balusters, around both. The dormers relieve the severity of the roof lines. Dimensions: Front, 34 ft. long; side, 44 ft., exclusive of veranda projections. Heights: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; attic, 8 ft. Underpinning of brick; stone sills to cellar windows. Exterior framework above sheathed, papered and shingled; gray in color. Roof shingled, and stained moss green. Trimming color, cream white. The first floor plan shows a good sized reception hall, with staircase (of which an interior view is published) of oak, with ornamental newel and turned balusters, also seat of neat design; plaster tinted terra cotta; staircase lighted by double arched leaded glass window. Parlor has angle fireplace, tiled, and mantel, and connects by broad sliding doors with dining-room, having a corner fireplace, tiled, with mantel above, the projection forming square bay. French window to rear porch. Butler's pantry, containing dresser, sink, and back stairs, is means of passage to kitchen, complete with the usual fixtures, and a good sized pantry or closet. Second floor is divided into four chambers, with ample closet accommodation, and bathroom, with usual fixtures of best make. Attic has one room finished off. Cellar, cemented, contains laundry, furnace, fuel storage, etc. Chimneys of brick, capped with stone. Finish throughout, white pine, stained on first floor, painted above. Hardwood floors in principal rooms. Cost complete, $7,500. Messrs. Stevenson & Greene, architects, Temple Court, New York City. J. C. Sawkins, builder, Flatbush, L. I.

Our illustrations were engraved direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT BRONXWOOD PARK, N. Y.

On pages 36 and 37 we illustrate a dwelling at Bronxwood Park, N. Y., the residence of M. F. Moore, Esq. The views show an interesting exterior, with broad, well shaded veranda its entire front and side, although not roofed over the entire distance in the latter instance. There is also a smaller veranda or porch, with balcony above, shown on other elevation. Dimensions: Front; 28 ft. 6 in.; side, 48 ft., exclusive of piazza projections. The underpinning is of local stone and brick. Exterior framework above sheathed, papered, clapboarded, and painted pale green on first story, second story dormers and gables being shingled, and stained yellow. Roof, and lower part of veranda, slate. Trimming color, white. Barge and water table boards, deep red. Shutters painted white. The plan shows an original arrangement of rooms. Entrance door at side, paneled, and glazed with beveled glass. Hall of good size, floored with oak, finish and stairs, with ornamental newel and turned balusters, being in the same wood. Parlor and dining-room have sliding doors and angle fireplaces, the former having square bay, with seat. Kitchen contains the usual fixtures and closet. Second floor divided into four chambers, with ample closet accommodation, and bathroom, with the very best fixtures, all work being exposed and nickelplated. Flooring throughout, except where mentioned, Carolina pine. Finish, where not noted, cypress and white pine, best rubbed work. Cellar, cemented, contains laundry, hot air heater, fuel storage, etc. House cost, complete, $6,000. J. Melville Lawrence, Esq., architect, Mount Vernon, N. Y.

Our engravings were made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT MOUNT VERNON, N. Y.

We publish on page 39 the residence of Dr. W. F. Greene, on First Avenue, Mount Vernon, N. Y. The view shows an interesting exterior, treated in the Colonial style. There is a well shaded veranda, with Ionic columns (fluted) supporting the roof above. Bay windows and balcony effect at dormer are principal features. Dimensions: Front, 31 ft. 8 in.; side, 55 ft. 8 in., exclusive of veranda projection. Heights: Cellar, 8 ft.; first story, 10 ft.; second, 9 ft.; attic, 8 ft. Underpinning of well burnt brick. Exterior framework above sheathed, papered, clapboarded, and painted yellow; trimming color, cream white. Roof covered with best quality Pennsylvania gray slate, ¼ inch in thickness. The plan is conveniently arranged, and, for the special purpose of a doctor's residence, well thought out, keeping the patients' rooms entirely separate from the living apartments. Outside entrance doors and side lights glazed with leaded glass; inside, beveled. Vestibule, tiled, has door to reception or waiting room, and thence passage to office, having angle fireplace and closet; door to operating-room, fitted with sink. Reception hall, of good size, finished in oak, and having three arches, supported by Ionic columns at platform in bay; arched angle fireplace of mottled Tiffany brick, and seat at oval window under stairs. Parlor has bay; fireplace, faced with white tile, and mantel, with three oval plate mirrors; finish, white enamel. Sliding doors to dining-room, with bay its entire width, and fireplace, tiled. This room is finished in natural white pine, with plaster walls and ceiling. Butler's pantry has wide dressers, sink, and a dumb-waiter to kitchen, complete with usual fixtures, on floor below, and to floor above. Second floor plan shows a large sitting and dining room, with bay their full width; three chambers, with generous closet accommodations; bathroom, with tub and basin of best quality, all plumbing being exposed; linen closet, and a pantry, with dresser, sink, and dumbwaiter outlet. Attic has two servants' rooms and billiard room finished off. Cellar, cemented, contains kitchen, laundry, hot water heater, and fuel storage space. House is lighted by gas and electric light, and cost, complete, $8,000. Walter F. Stickles, Esq., architect, Fairfax Building, Mount Vernon, N. Y.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT BERGEN POINT, N. J.

The subject of illustration on page 40 is the recently completed residence of Wm. E. Rogers, Esq., at Bergen Point, N. J. The view shows an original and pleasing exterior, with well shaded piazza and balcony, circular bay forming corner tower. Dimensions: Front, 24 ft.; side, 42 ft. Heights: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; attic, 8 ft. Underpinning of brick. Exterior framework above sheathed, papered, clapboarded, and painted yellow on first story, except at piazza, which, as well as all above, is shingled, and stained brown. Roof shingled and left to weather. Round, octagonal and straight butt shingles are used effectively. Balusters, etc., yellow. Trimming color for columns, bands, etc., cream white. The plan is conveniently arranged, with reception hall, well lighted, having staircase, ornamental newel, with candelabra and turned balusters; sliding doors to parlor of good size. Library, similarly connected, has bay its entire width, open fireplace, and sliding doors to dining-room, with similar bay. Butler's pantry leads to kitchen, with range, sink, dresser and boiler; also, back stairs. Second floor plan shows five chambers, principal one having circular bay, with seat, and bathroom, arranged with usual fixtures; plumbing exposed, and of the best. Attic has one room finished off. House finished in cypress throughout. Cellar, cemented, contains laundry, hot air furnace, and fuel storage. Cost complete, $4,200. Wesley J. Havell, Esq., architect, 66 Liberty Street, New York City.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT BEDFORD PARK, NEW YORK CITY.

The views on page 42 illustrate the residence of John A. Amundson, Esq., at Bedford Park, New York City. The design is treated in the English Gothic style, with a suggestion of Romanesque feeling in the gables. There is a broad, well shaded veranda, running the full width of house; the octagonal tower, broad treatment of gables and bays, richness of detail of frieze, bands and barge-boards, and entrance gable are the principal exterior features. Dimensions: Front, 43 ft. 3 in.; side, 69 ft., inclusive of all projections. Heights: Cellar, 7 ft.; first story, 10 ft. 7 in.; second, 9 ft. 3 in.; attic, 8 ft. 3 in. Underpinning of local stone, gray in color, and with joints well broken. Framework above sheathed, papered, clapboarded, and painted yellow. All above shingled

and painted same color. Roof also shingled. Trimming color, dark green; sash, terra cotta. Double entrance door at angle, glazed with leaded glass of original design. Vestibule tiled in mosaic. Hall, finished in quartered native oak, with exposed ceiling beams, has seat in nook, niche, tiled fireplace, and mantel above. Staircase has ornamental newel and turned balusters. Sliding doors to dining-room, which also has beams exposed, 5 ft. wainscoting, and is trimmed in antique oak; fireplace at angle. Parlor trimmed in quartered sycamore, with bay its full width, having fireplace as central feature. Library has paneled ceiling same as dining-room; finish, selected red cedar. There is generous book room and angle fireplace. Butler's pantry, provided with dresser, basin and sink, is means of passage to kitchen (in cypress), complete with usual fixtures, including gas attachment for range. Second floor, trimmed in cypress, shows six rooms, including bath, which has tiled floor and walls, enameled tub, and other fixtures, of best make, all plumbing being exposed and nickelplated. The attic has large billiard room, full length of house, and three bedrooms finished off. Cellar, cemented, contains laundry, servant's bathroom, hot air heater, and fuel and storage space. Any further information may be obtained of the architect, Edgar K. Bourne, Esq., 18 Broadway, New York City.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A TWO-FAMILY DWELLING, NEW HAVEN, CONN.

We present on page 43 a two-family dwelling house, recently erected for John F. Hanley, Esq., at New Haven, Conn. The engravings show perspectives executed so as to give the building the appearance of a private residence, while the plans are arranged for two families, with their several apartments, modern conveniences, and their respective privacy to each other. The underpinning is built of red sandstone, with rock-faces and rounded joints. The cellar walls are laid in cement, and the bottom has a coat of Rosendale cement 1½ inches thick, and a coat of Portland cement on top of same. This cellar contains furnace, laundry, cold storage and coal rooms for each apartment. The building above, of wood, is covered with clapboards, and painted silver gray, with brown trimmings. The gables are shingled. The roof is covered with octagonal cut slates. Dimensions: Front, 30 ft. 4 in.; side, 48 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 9 ft.; second, 9 ft.; third, 8 ft. The vestibule has a floor laid with tiles. The halls, parlors and dining-rooms are trimmed with ash. The former, leading to second floor, contains an ornamental staircase, with carved newel posts and candelabra. This stairway and hall are lighted by a stained glass window. The parlors and dining-rooms have mantels of ash, with mirrors and columns. The kitchens and pantries are trimmed and wainscoted with North Carolina pine, and they are fitted up with the usual fixtures complete. The ice-box rooms are packed with mineral wool. The bedrooms are provided with closets, good light and ventilation, and are trimmed with cypress. The bathrooms are wainscoted, and furnished with the usual fixtures, with exposed plumbing. The third floor contains two bedrooms and trunk rooms for each family. The floors are laid with rift stock North Carolina pine, finished natural, and highly polished. Cost, carpentry and masonry, $4,250; plumbing, $495; heating, $335. Total, $5,080. Messrs. Stillson & Brown, architects, 87 Church Street, New Haven, Conn.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

ST. ANN'S EPISCOPAL CHURCH, KENNEBUNKPORT, ME.

We present on page 46 perspective interior views and ground plan of St. Ann's Episcopal Church, erected by the Cottage Colony, at Kennebunkport, Me. Situated on a point of land commanding a wide view of the ocean, it is a veritable chapel by the sea, and it is erected on a solid rock foundation. The building is constructed of shore rocks, most beautiful in color, and showing fine shades in old blues, browns, grays and reds. The stones are so put together on the interior that they present a beautiful effect. The building is relieved from a too depressed appearance by a heavy tower, surmounted with a tapering roof, and finally crowned with a cross. The roofs are shingled, and left to weather finish. The extreme length is 95 ft., and the width is 45 ft. The interior is trimmed with oak, and the furniture is of similar wood. The roof is upheld by heavy trusses, supported on massive brackets, from which spring Gothic arches. The under side of roof is beamed and ceiled with narrow beaded stuff. The auditorium has a seating capacity of three hundred. Its dimensions are 26 ft. by 55. The chancel, 18 ft. by 20 ft., is furnished with a tiled floor, laid in mosaic. The walls are lined with buff brick. The altar is built of glazed brick, and the chancel rail of white marble. The choir and organ loft are located in the gallery, at the front of church. The vestry is conveniently located, with the necessary appointments. The dotted lines shown on ground plan present the outline for the new transept. Mr. Henry Paston Clark, architect, Studio Building, Boston, Mass.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT WILLIAMSPORT, PA.

On page 45 we give a photo and plans of J. F. Fredericks' new residence, Williamsport, Pa. The foundation is built with native bluestone, laid broken ashlar. The walls are laid with mottled buff brick made of fire clay. The roof is slated, and gables shingled. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 10 ft. 6 in.; second story, 9 ft. 6 in.; third floor, 8 ft. 6 in. The first floor is finished in quartered oak, including the stairs, mantels and floors, and all given a polished finish. The second floor is finished in white spruce and painted in tints, the bathrooms in oak. The plumbing is first class, and the house is heated with steam indirect system. David K. Dean, architect, Williamsport, Pa.; Huffman & Sons, of same place, the builders.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A HOUSE AT FAR ROCKAWAY, N. Y.

This aristocratic example of a thoroughly Colonial house, which is illustrated on page 44 of SCIENTIFIC AMERICAN, has porches on four sides, and yet is so arranged that all the rooms have windows, through which can enter the clear, unshaded sunlight. From the hall open the reception room and parlor, through arches of columns. Seats are placed around the staircase, and in the circle in the parlor and bedroom above it. There are large fireplaces in the reception room, dining-room and parlor. There is a convenient side entrance, sheltered by a porte-cochère, readily accessible to the reception room. The kitchen and butler's pantry are both light, of good size, and amply supplied with closets. There is a rear porch, and laundry in the cellar. Cellar extends under the whole house. There are six bedrooms and a bath on the second floor, and three rooms finished in the attic. This house was built under the plans and superintendence of Child & De Goll, architects, 62 New Street, New York.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE IN TENNIS COURT, FLATBUSH, N. Y.—See page 34.

The Elevator Business.

The New York *Evening Post* gives some curious statistics of the elevator traffic in the large office buildings of New York. As might be supposed, the largest traffic is to be found in the Equitable Building, which contains a great number of lawyers' offices, besides those for ordinary business. This building contains thirty-two elevators, of which, however, only ten are for public use. These elevators are under the care of fifteen men, and carry, on an average, about forty thousand passengers a day. Unfortunately, no accurate record of the number of passengers has been kept during the past year, but the record for the previous year showed that an average of thirty-eight thousand passengers a day was transported, and the traffic is believed to have increased since then. All the Equitable Building elevators are hydraulic. Each car uses five hundred gallons of water at each trip, and the total consumption of water is about four hundred and fifty thousand gallons an hour. This would be a good supply for a city of one hundred thousand inhabitants, and the pumps are required to raise this quantity to a head equivalent to about two hundred and fifty feet. Of course, the water is used over and over, discharging into tanks in the cellar, and being raised again to the roof. In the Mills Building, on Broad Street, about twenty thousand persons a day are carried in the elevators; and in the Havemeyer Building, about fifty-seven hundred. In the latter building, a stormy day causes a falling off in the passenger traffic of about a thousand persons. In Boston, the elevator traffic of one or two of the larger buildings must approximate that of the Equitable Building in New York, but Boston business hours are longer, and the office buildings not so high as in New York. It is instructive to compare this enormous traffic with the passenger business of a Western railroad, as an illustration of concentration of activity in our great metropolitan cities.

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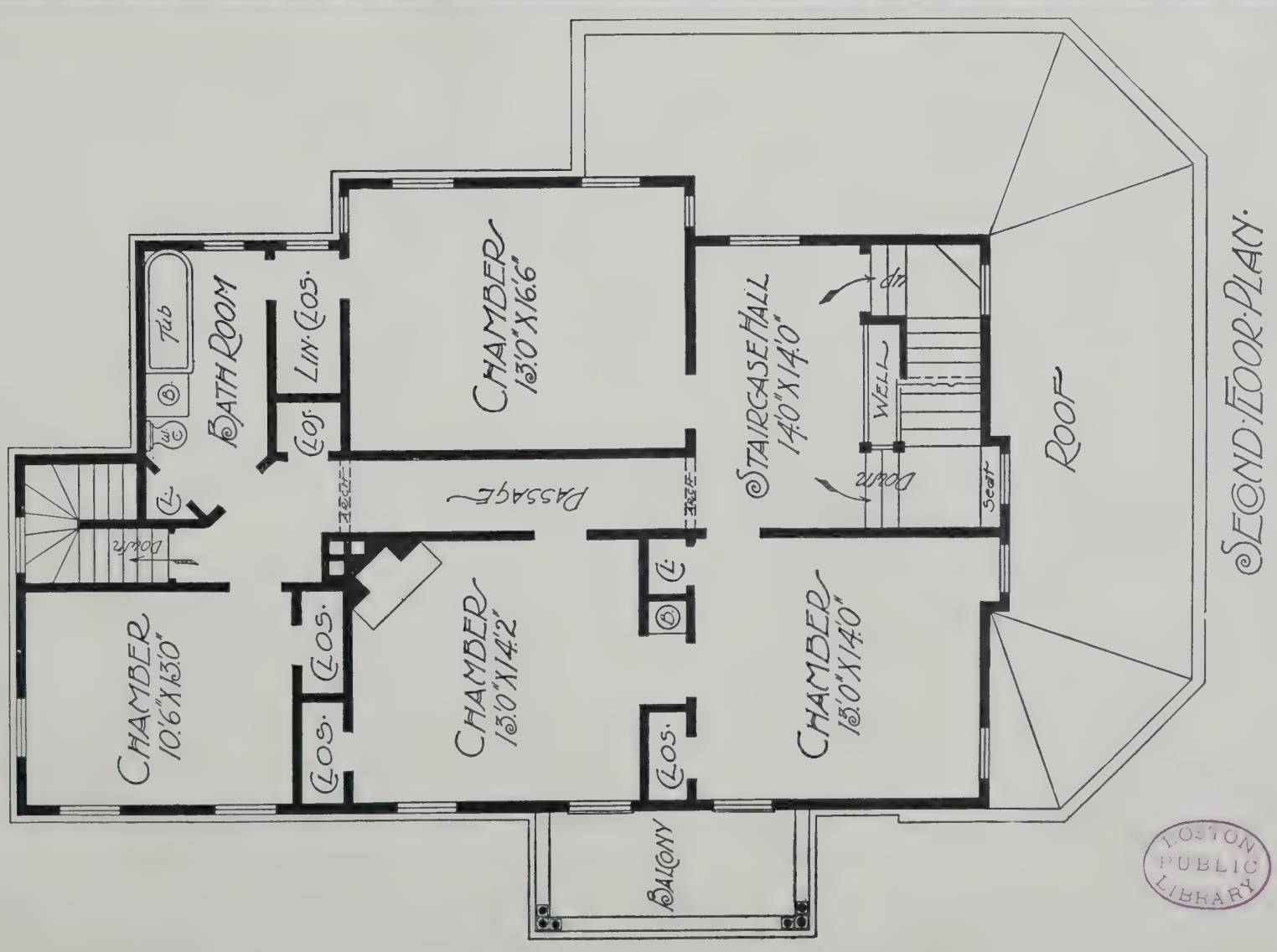
A DWELLING AT BRONXWOOD PARK, N. Y.—See page 34.



A DWELLING AT BRONXWOOD PARK, N. Y.- See page 34.

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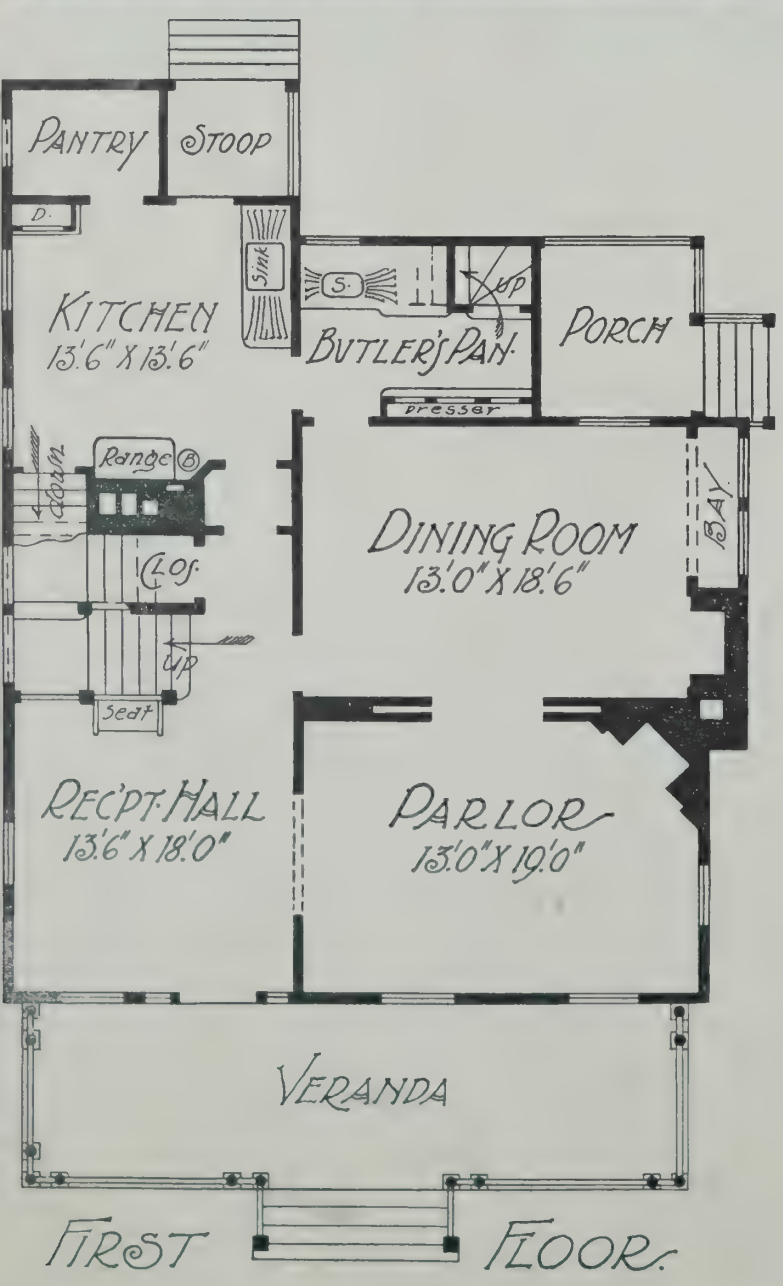

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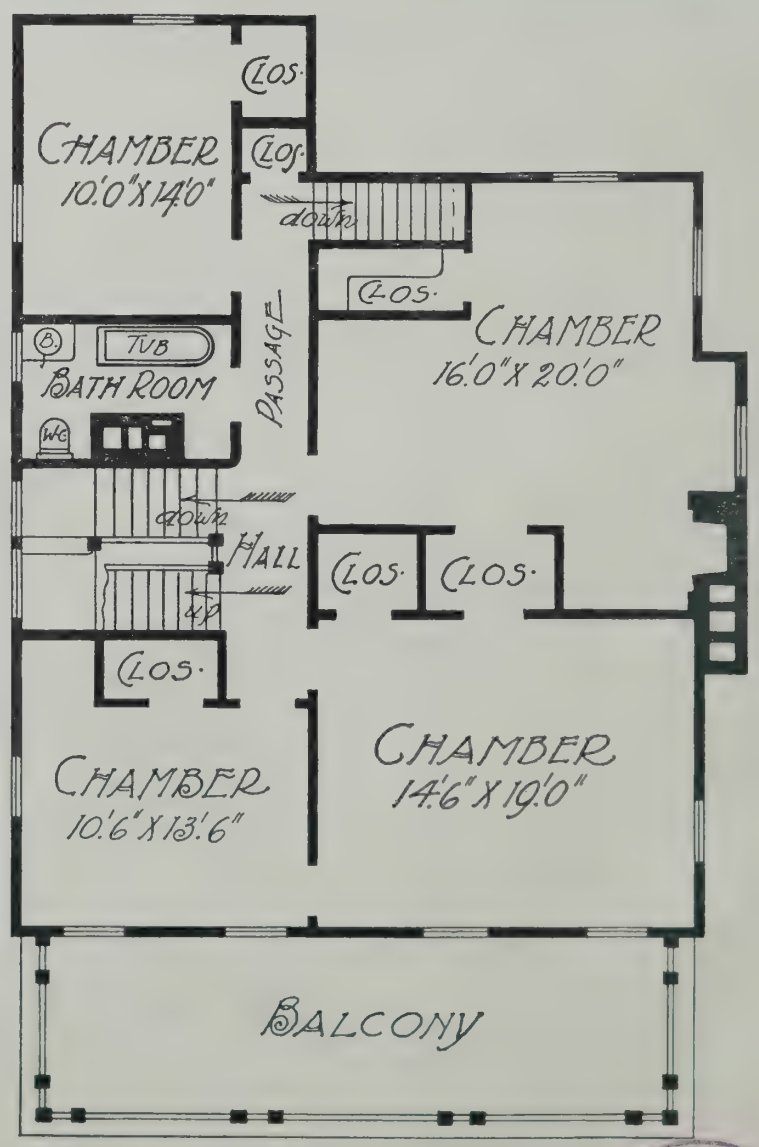
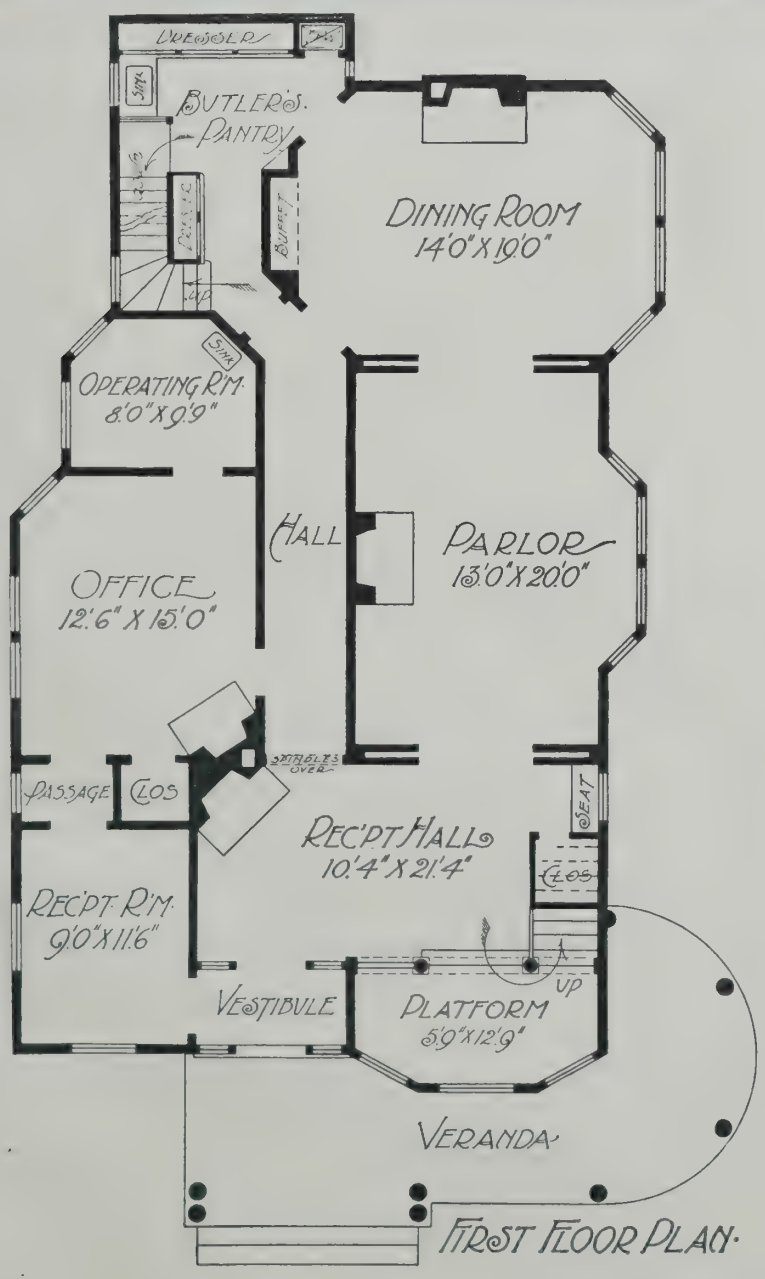
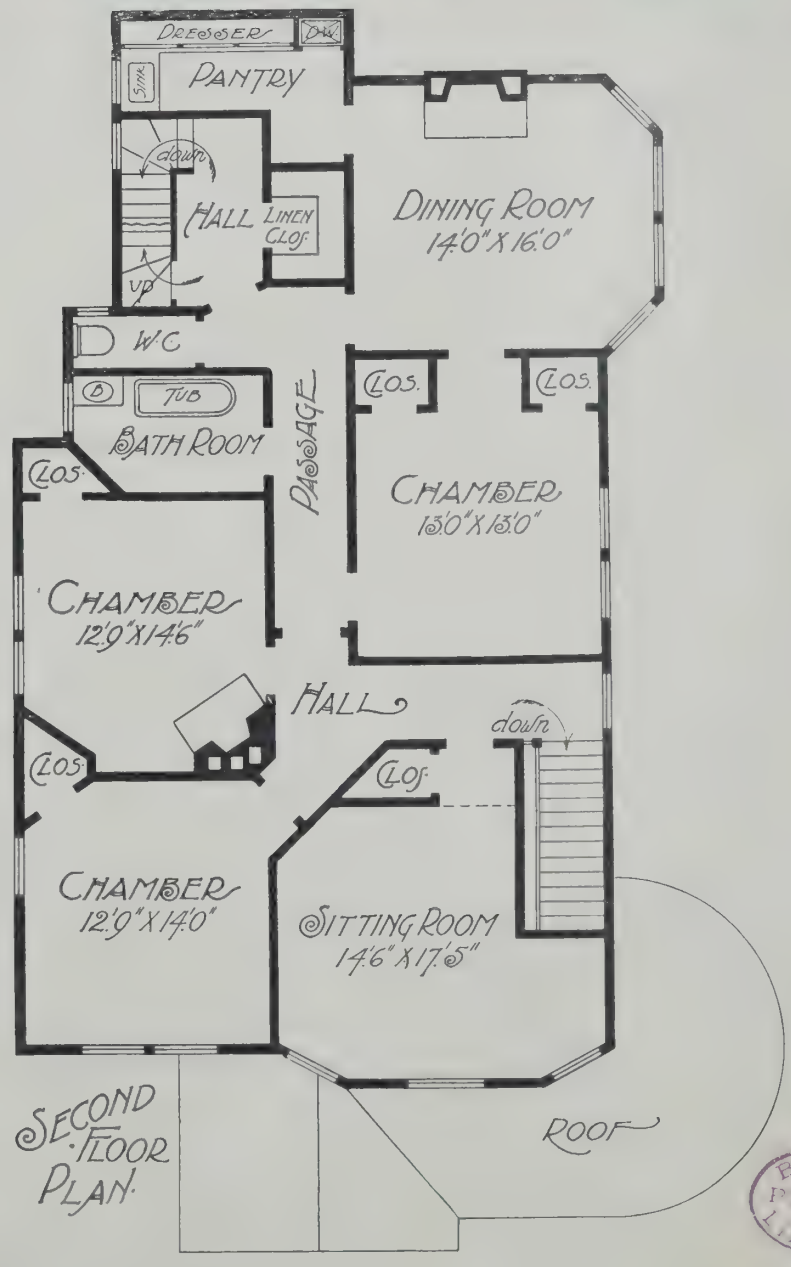


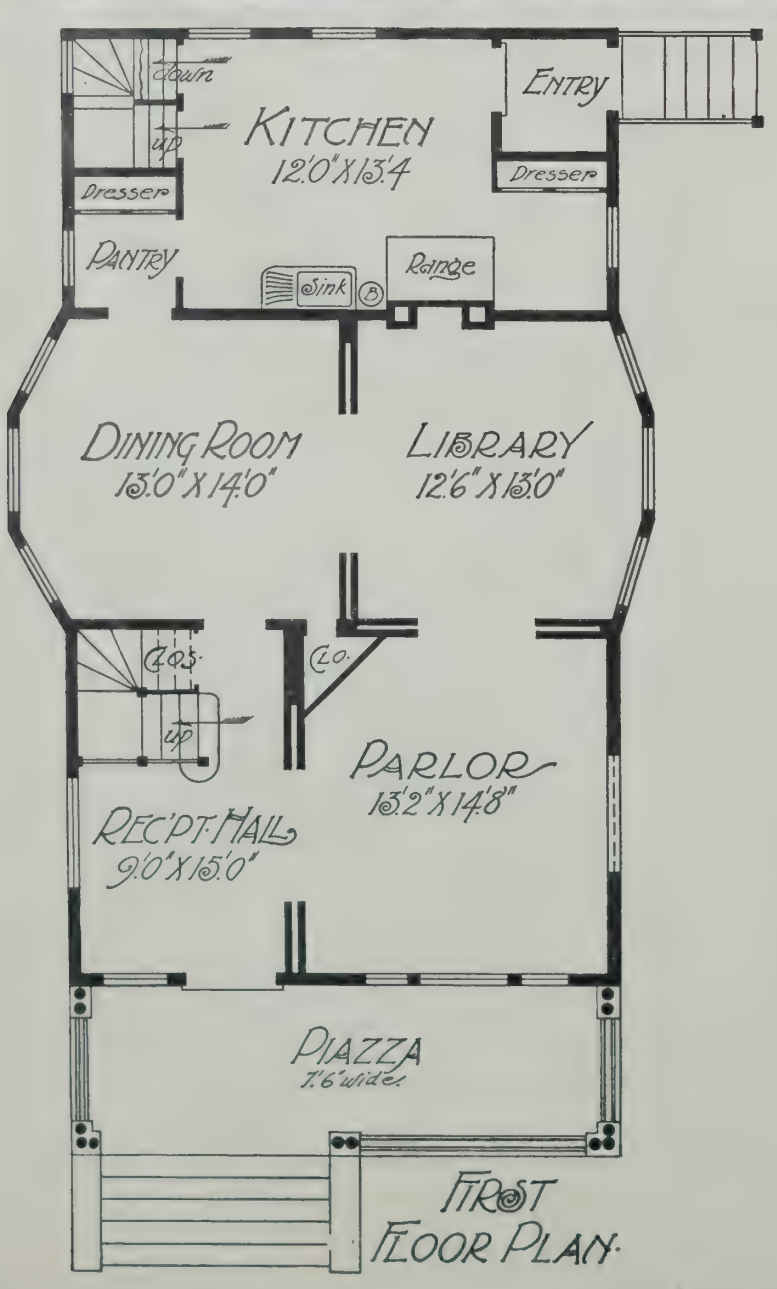
SECOND FLOOR PLAN.

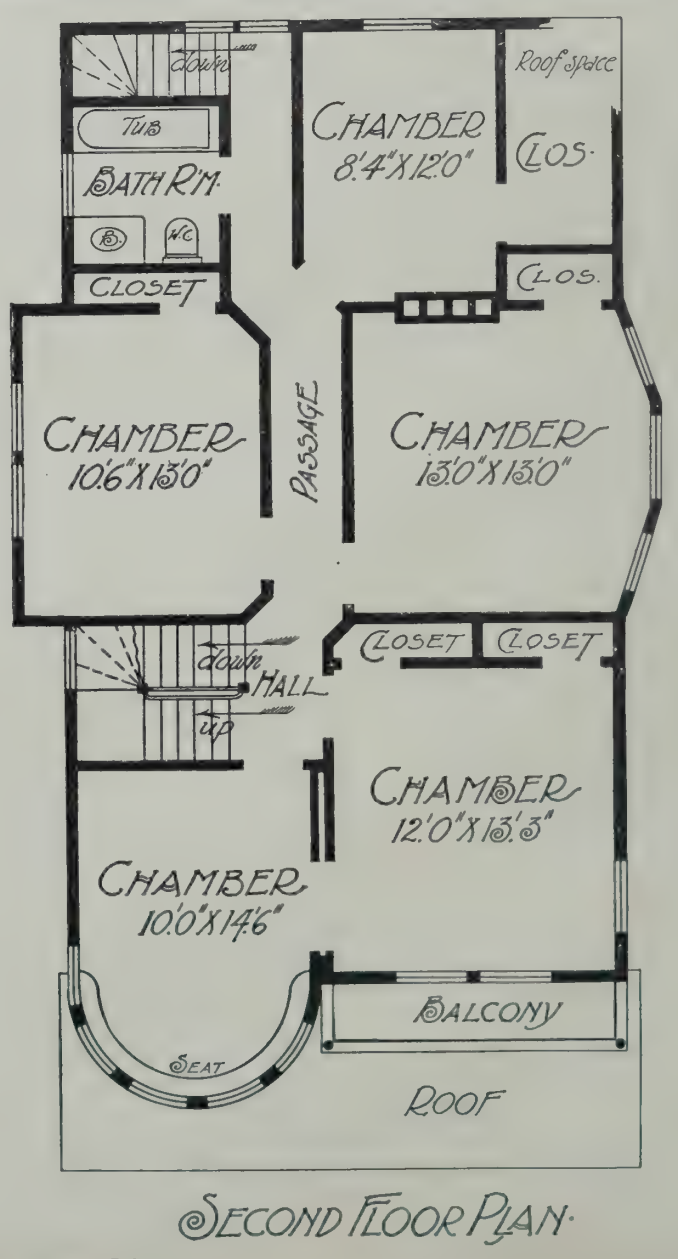
RESIDENCE IN TENNIS COURT, FLATBUSH, L. I.—See page 34.



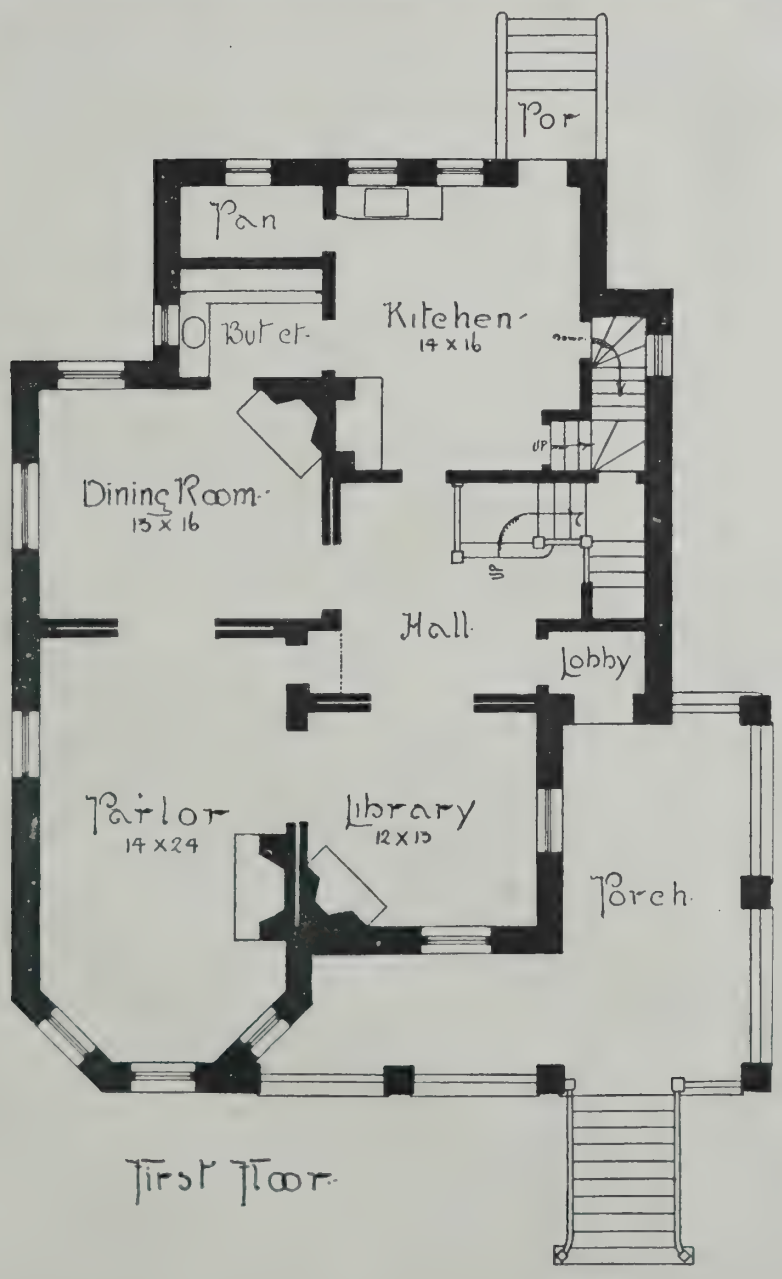


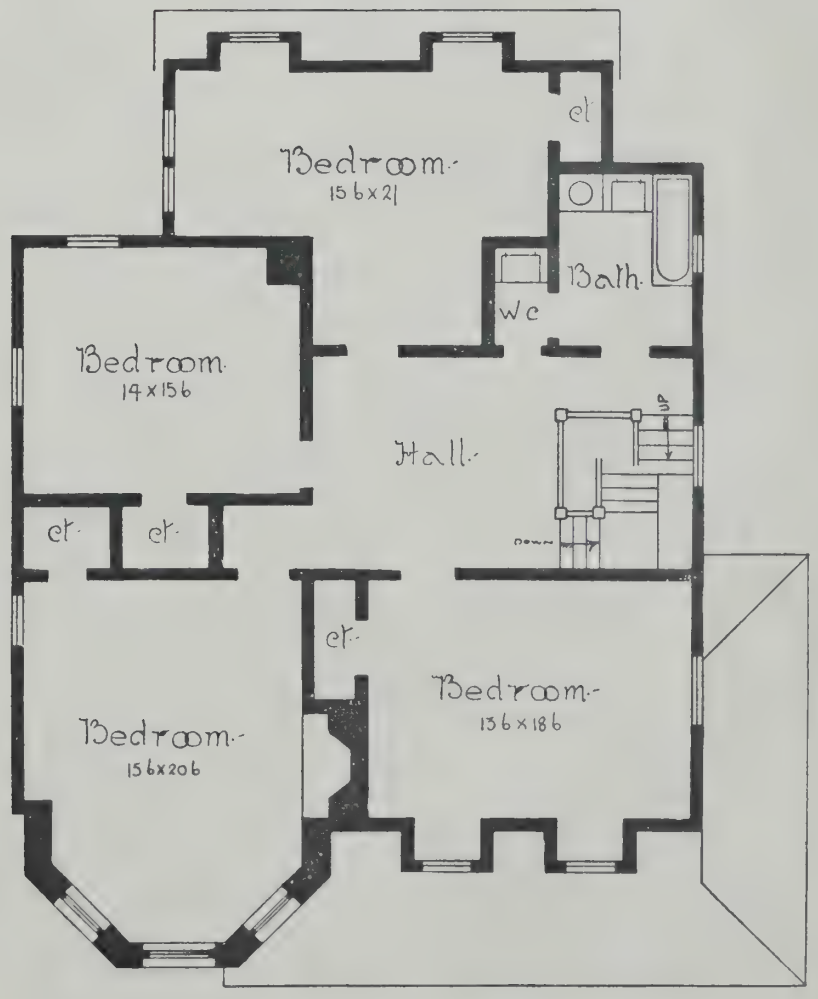
A RESIDENCE AT MOUNT VERNON, N. Y.—See page 34.





A COTTAGE AT BERGEN POINT, N. J.—See page 34.





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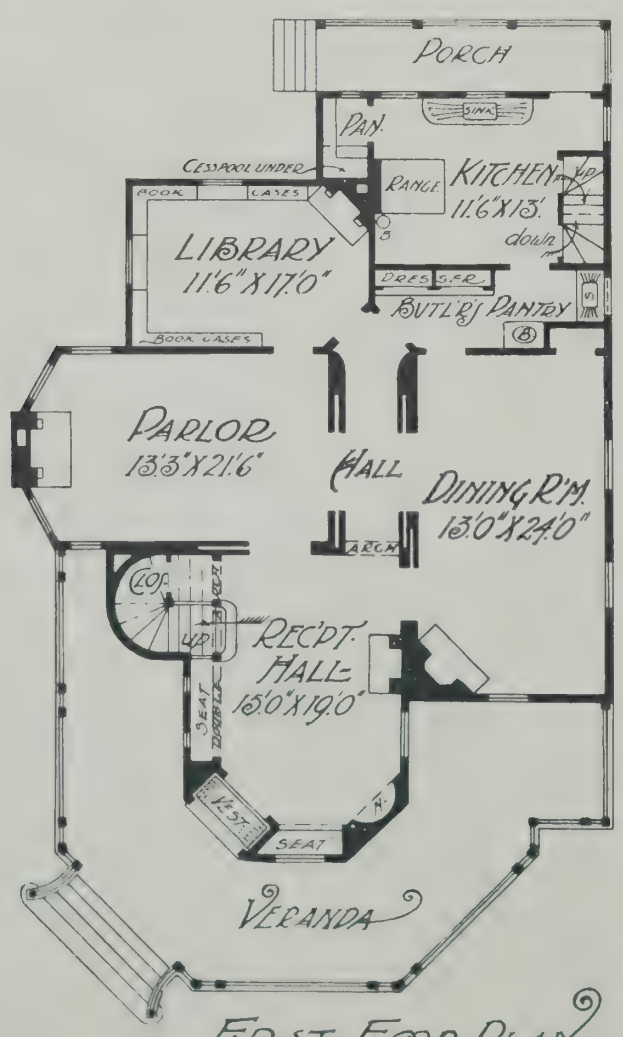
A RESIDENCE AT EDGEWATER, CHICAGO, ILL.—See page 34.



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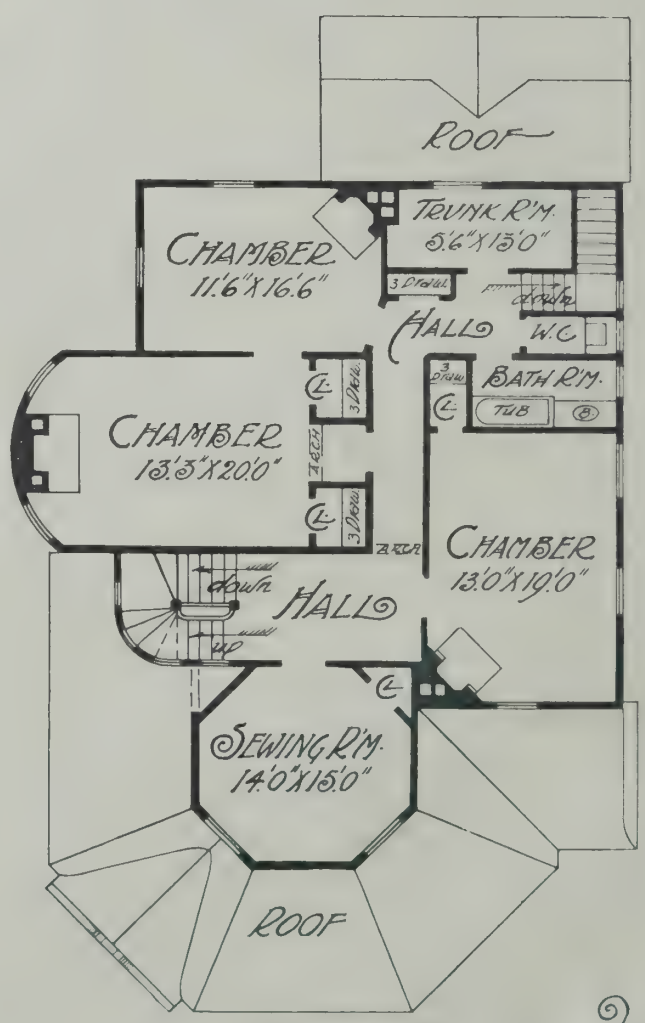

SECOND FLOOR PLAN.

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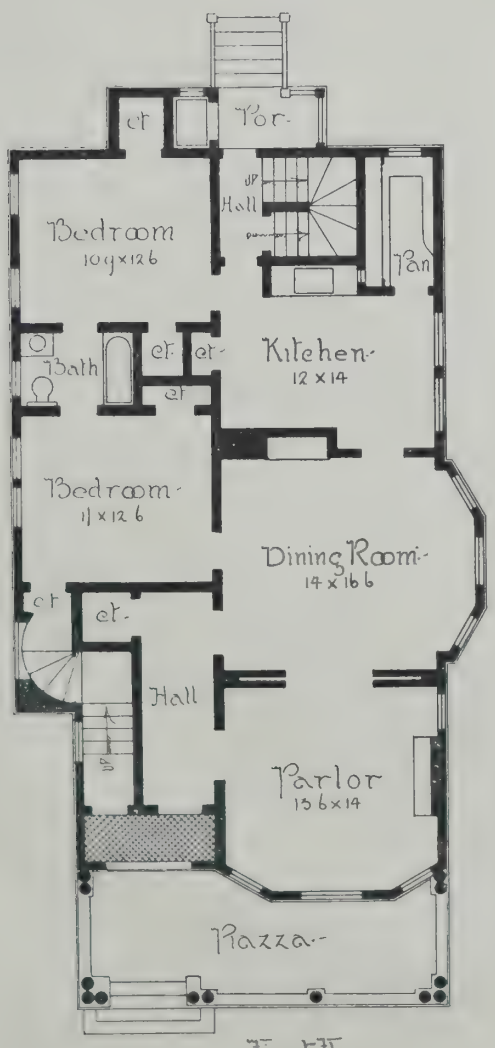
A DWELLING AT BEDFORD PARK, NEW YORK CITY.—See page 34.



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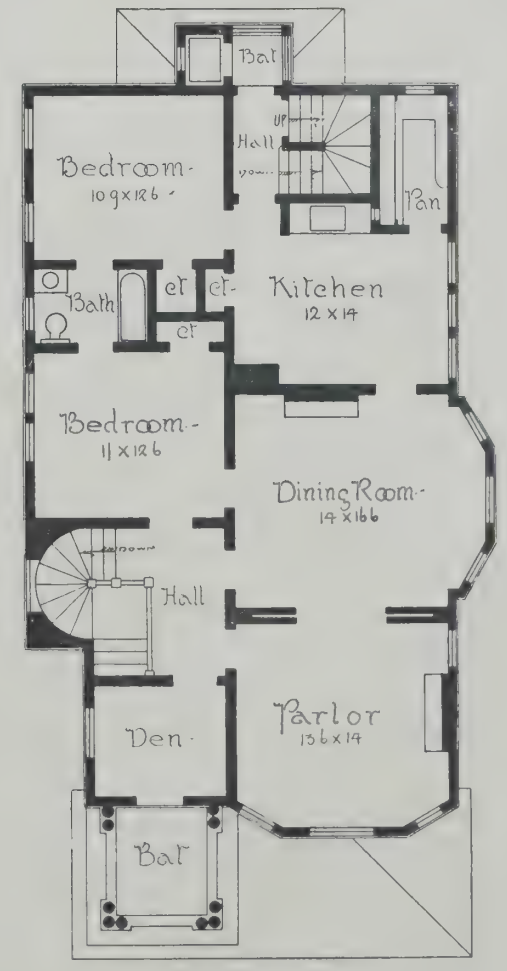

Second Floor.

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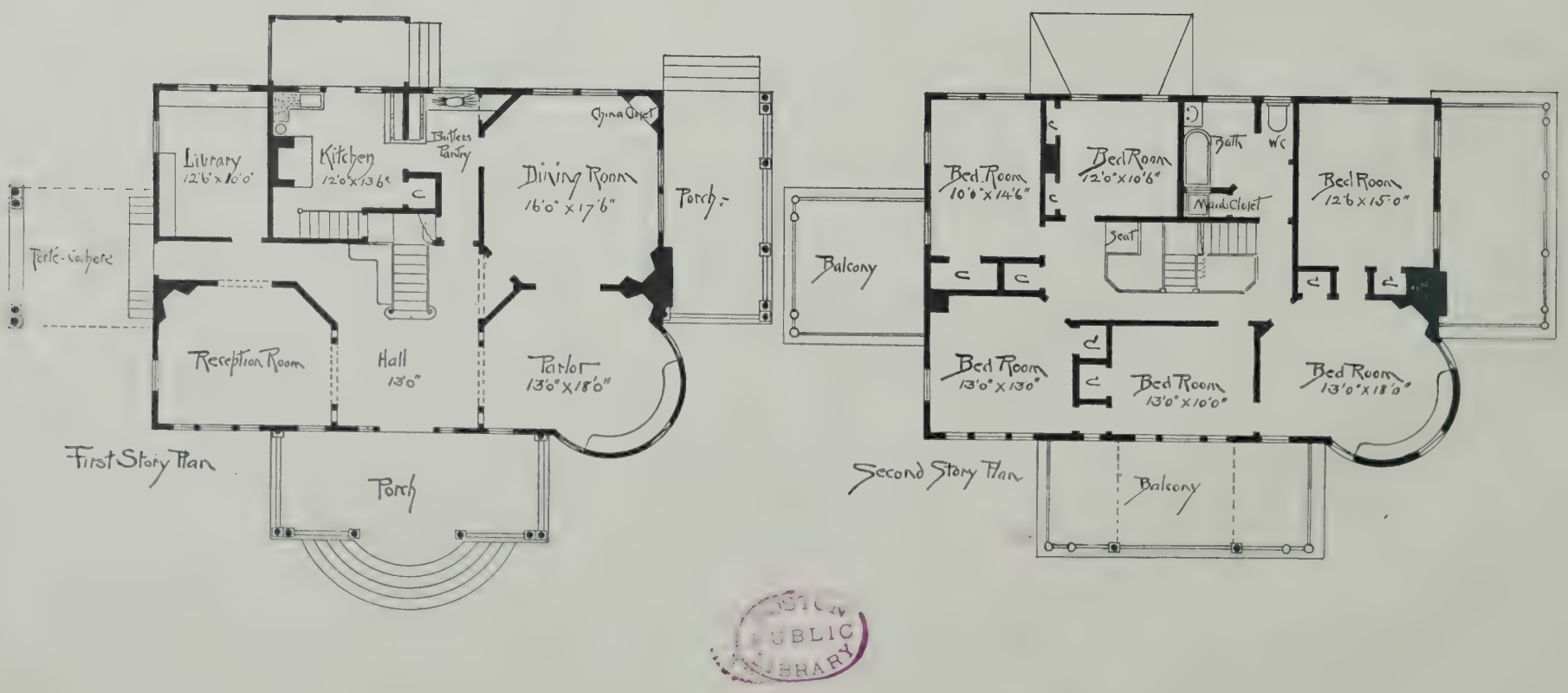
A TWO-FAMILY DWELLING AT NEW HAVEN, CONN.—See page 35.



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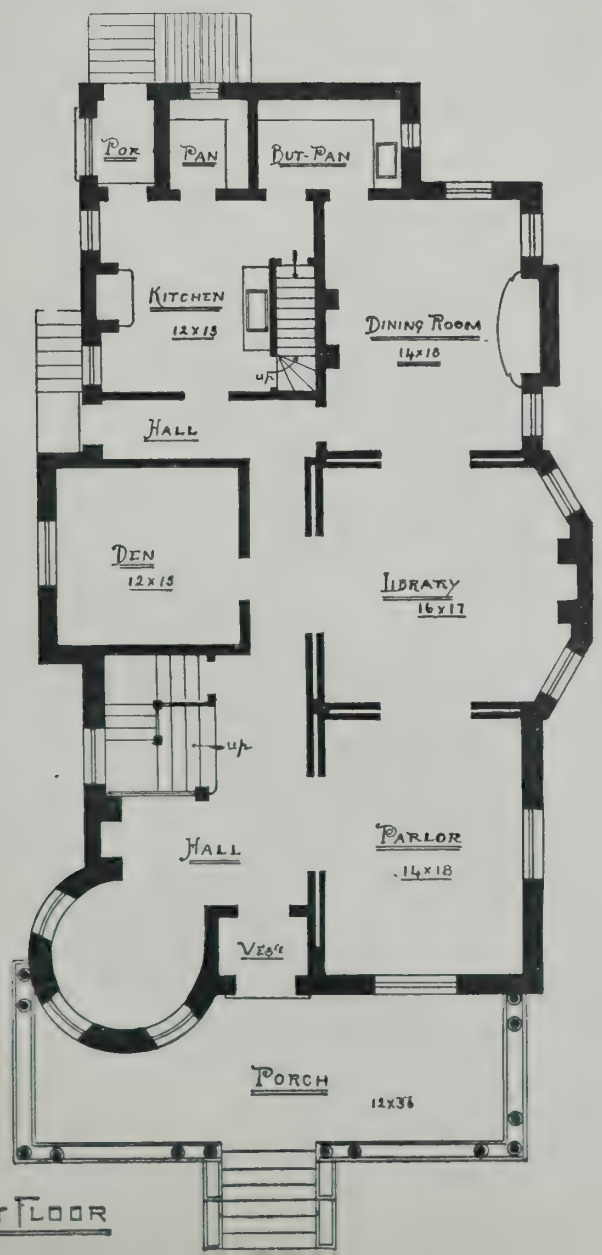
A HOUSE AT FAR ROCKAWAY, N. Y.—See page 35.



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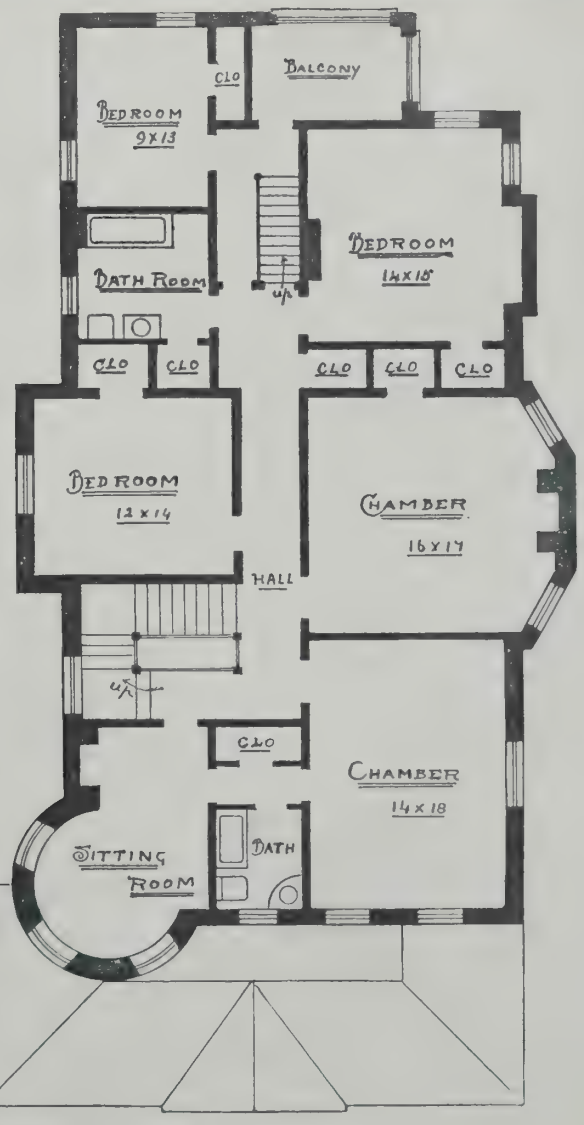

SECOND FLOOR

A RESIDENCE AT WILLIAMSPORT, PA.—See page 35.

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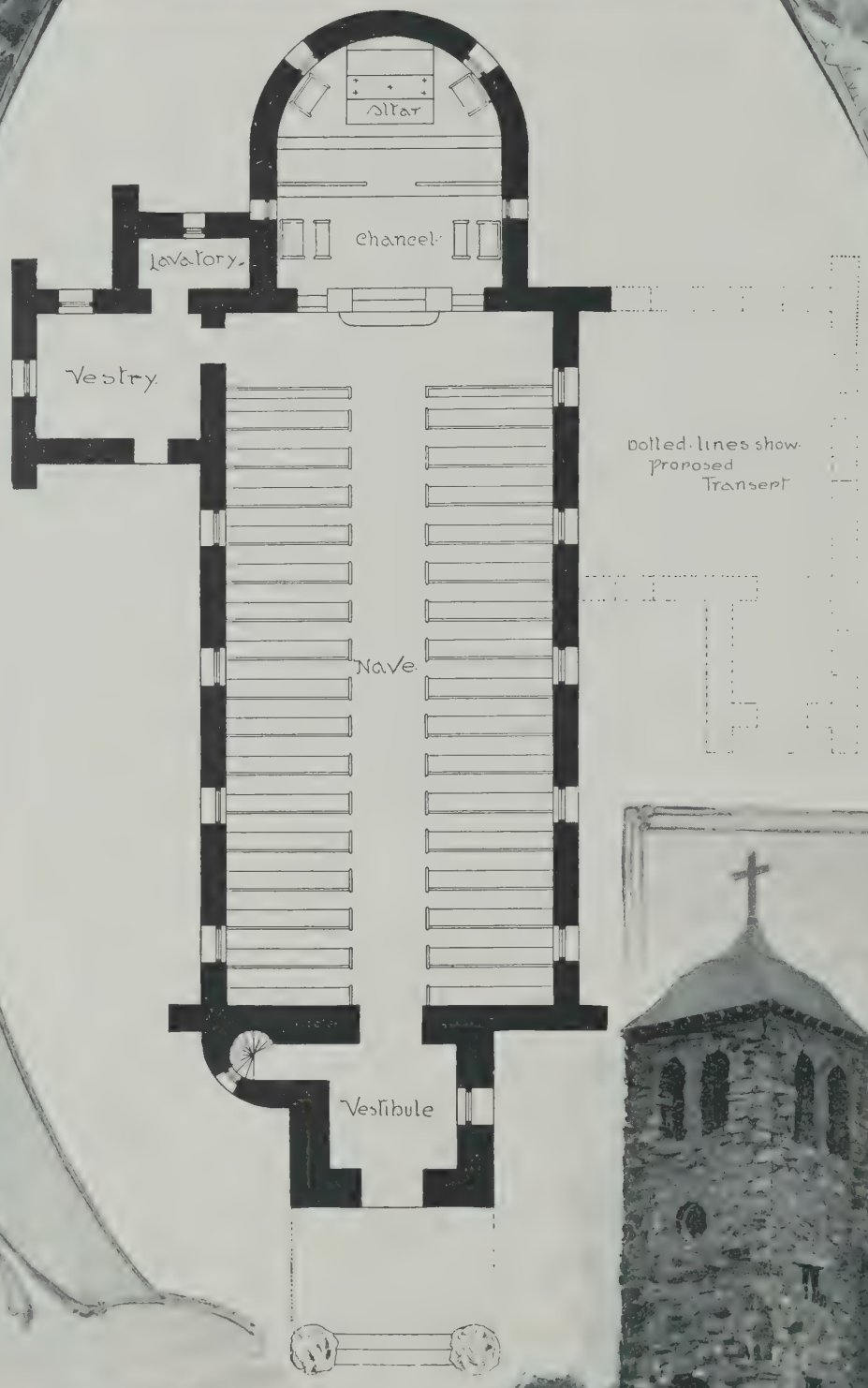

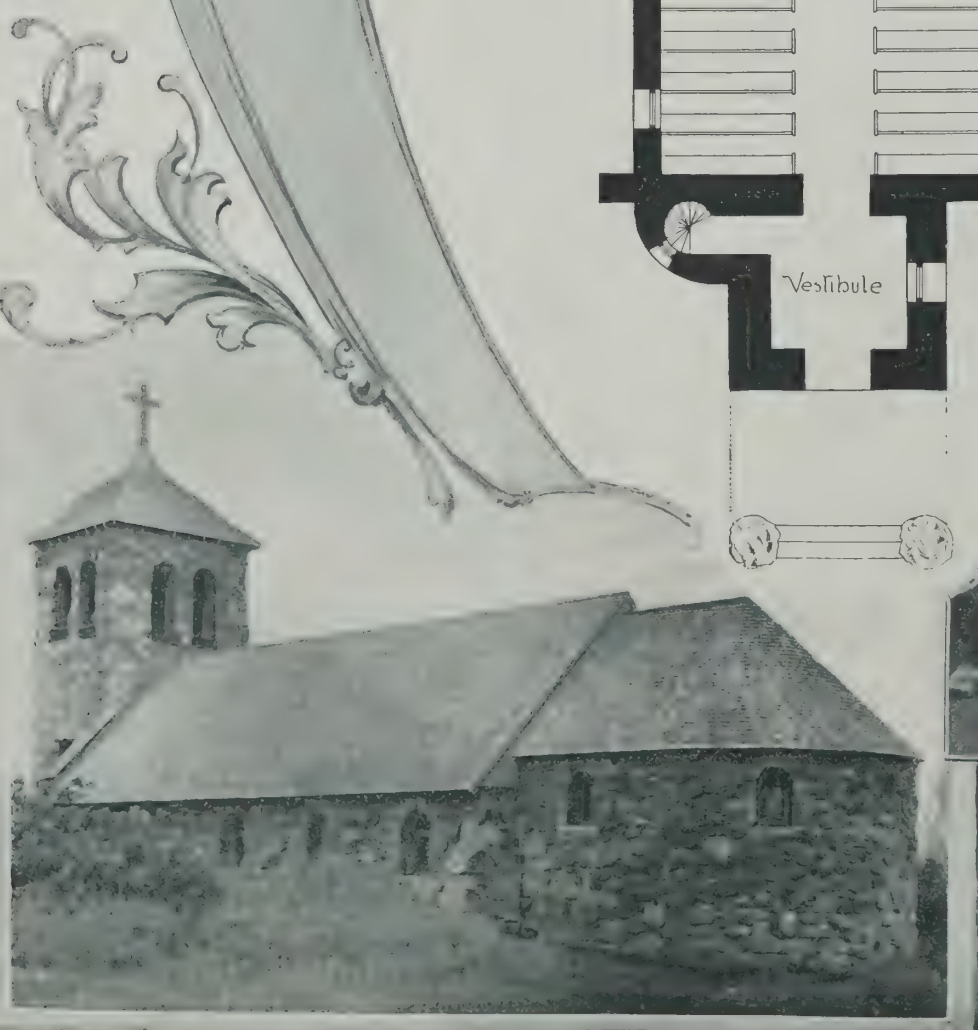

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ST. ANN'S EPISCOPAL CHURCH, KENNEBUNKPORT, ME.—See page 35.

THE HAYES METALLIC LATHING.

About a year ago, we illustrated a metallic lathing invented by Mr. George Hayes, of New York. It was corrugated, expanded and looped from a sheet of metal, say, 30 x 96 inches, without any loss in area or thickness,

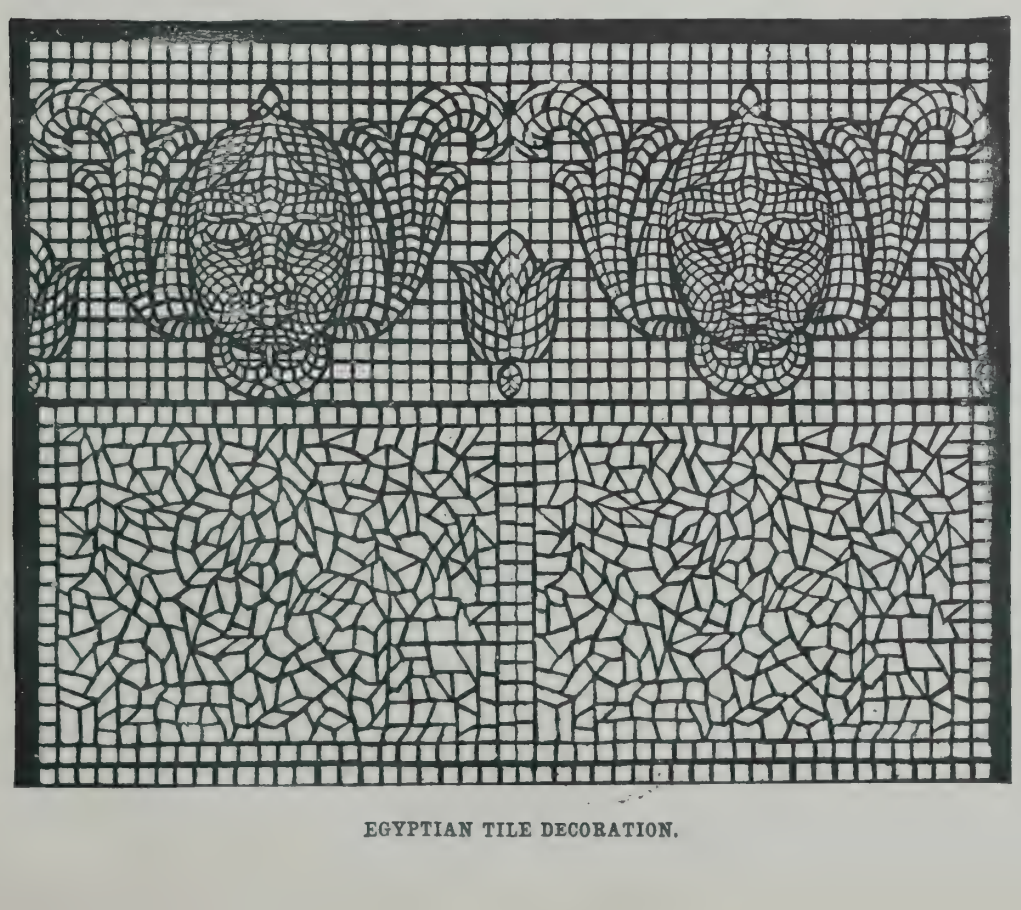
effecting a large saving of material. The metal taken from the surface of the sheet by the corrugations is compensated for by the expansion of the slits into apertures. To effect a combination by adding the hooked and lipped apertures, a well-known feature of the "Hayes" lathing, and one which has been so largely and so successfully adopted, Mr. Hayes has invented most perfect machinery, whereby he is enabled to lubricate, slit, puncture, corrugate, expand, loop and coat eighty square feet of this lathing per minute, in one operation and upon one machine, all ready for shipment.

This lathing is known on the market as the "Hayes Combination," and is extensively used. Mr. Hayes at the present time is engaged in constructing many thousand yards of solid and hollow partitions, notably in the Metropolitan Life and the Vanderbilt Hospital buildings, in New York, of from 1 inch to 2½ inches in thickness. In many instances where this partition is adopted, it supersedes 8 or 12 inch brick walls, thus effecting a great saving of floor space. It has been practically demonstrated that to construct safes or fireproof rooms of this metallic lathing plastered is very successful, and that such construction has stood the test of 1,800 degrees Fahrenheit. Two hours after being submitted to such heat, the contents of the room or safe, consisting of silk paper, draft blanks, etc., were found to be uninjured.

A fireproof room in a private dwelling house is a very desirable and useful acquisition, and is attainable at a comparatively small cost.

NEOLITH AS A PAINT AND DECORATIVE MEDIUM FOR RELIEF WORK.

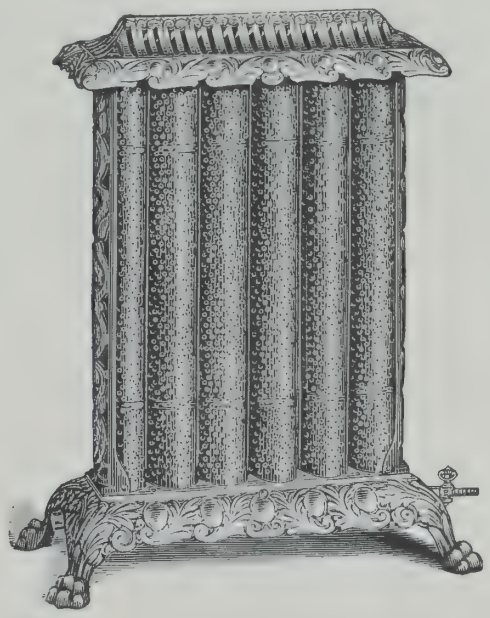
The mosaic work illustrated in the cut is made from Neolith, a comparatively new material, the name signifying "new stone." After being mixed and applied to a surface it becomes hard as a stone, and is fire and water resisting as a paint, and waterproof when used as a heavy surfacer or as a plastic. It is a dry, white powder, of a creamy or ivory whiteness, simply mixed for use with cold water. As a paint it kills the worst of water and creosote stains on plaster, and it is used for coating and finishing plaster, brick, wood, or iron, also for stopping suction on porous surfaces, as a foundation for other paints, either oil or water. We are indebted to Trade News Pub. Co. for our illustration, showing tiling on which the new material has been used. The walls and ceilings of Boston's new Public Library, recently completed, are finished with neolith in its natural tint, on fire brick and rough and smooth plaster. As a plastic it is used for relief decoration by the Harding embossing or incrusting process, or broad relief decorations can be secured in any style on plaster or other surfaces. This material and process is used for ornamenting the finest textile fabrics, open meshed or otherwise; plush silk, bolting cloth, burlap; designs may be varied unlimitedly, and soft, rounded outline afforded, the work being accomplished with exactitude, at a minimum of expense. This work can be moulded directly on the plaster, or furnished in panels of wood or paper. The entire decoration can be done at factory, and put in place by painter or carpenter using moulding to cover the joints, or the joints may be filled with neolith where a surface unbroken with mouldings is desired. Estimates and sketches made on application to the Neolith Company, 113 Sixth Avenue, New York.



EGYPTIAN TILE DECORATION.

GAS RADIATORS, FIRE GRATES, ETC.

The number and variety of the appliances supplied for cooking and heating by gas are being constantly extended, a great impetus being given thereto by the fact that the price of gas has, within the last few years, been constantly tending downward, while the facility with which



THE "VULCAN" PERFORATED GAS RADIATOR.

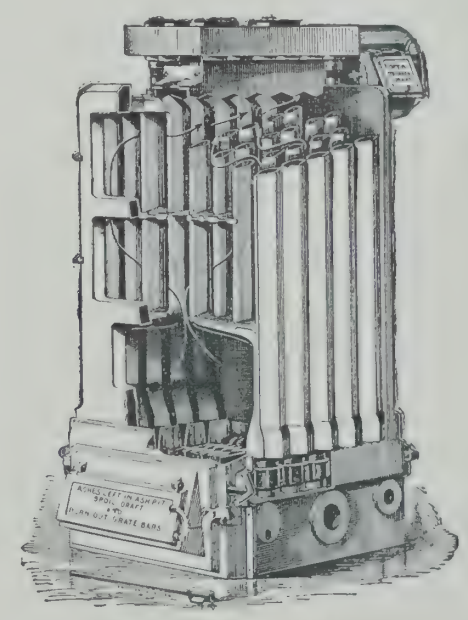
gas can be utilized makes it more readily available, at a low cost, than almost any other way of obtaining heat. Messrs. William M. Crane & Co., of No. 838 Broadway, New York, now supply a hot air furnace and a hot water furnace, designed to use gas solely for fuel, obviating altogether the nuisance of handling coal and ashes, and the necessity of attending to the furnace and looking after draughts, while the temperature in the house is always absolutely under control, no matter how cold the weather, and only needs the turning of a valve, or the "pressing of a button," as it were, to obtain the degree of heat desired. The same firm are also makers of gas fire grates, gas radiators, and gas appliances of all kinds, of the latest improved patterns, especially designed to afford the maximum amount of heat from the minimum consumption of gas, while presenting a most attractive appearance. One of these radiators is shown in the illustration, these being the only heating stoves with the flame visible from all points, thus giving to the room a pleasant, cheerful aspect. It is fitted with a glass shade of different colors, making a beautiful effect when lighted, and heats, without vitiating, the largest possible volume of cold air. A large amount of heated air is distributed through perforations at the base of the stove, thus heating the lower currents of cold air near the floor, where the heat is most needed. A representation

GAS LOGS AND ANDIRONS.

of the gas logs and andirons made by the firm is also presented in one of the views. The gas fire grates made by the firm, finished in antique brass, afford as nearly as possible an imitation of a coal fire, and at the same time are fitted to absolutely control the heat, having six burners, by which six degrees of consumption of gas and regulation of heat may be obtained. This is an important consideration for builders, for, where gas fireplaces are used, it does away with the expense of putting in an iron back and a brass frame. For all of these appliances the firm are having a rapidly growing demand, as users are coming to realize the actual economy, as well as the great convenience, of having just as much, and only as much, heat as is needed, and at just the time it is wanted.

IMPROVED HEATERS.

Among the best known hot water and steam house-heating boilers in the Middle Western States are the Capitol and Hecla heaters, manufactured by the United States Heater Company, of 201 Campbell Avenue, Detroit, Mich. The Capitol was the first heater brought out by this company, and is very extensively used. The works of this company, at Detroit, are very extensive and complete. We show herewith a broken-out view of the Capitol heater, which gives a pretty clear idea of the principal points involved in its construction, and which will be readily appreciated by all practical men. The manufacturers are strongly in favor of hot water as compared with steam for the heating of residences, and, while willing to furnish whatever is wanted, urge the selection of the Capitol hot water heater. In addition to the Capitol and Hecla heaters, they make a small boiler called the Mascot. This is manufactured for either hot water or steam heating, the hot water boiler being specially adapted for furnishing hot water supply for baths, laundries, etc., in hotels, hospitals, barber shops, and similar buildings. They publish a book called



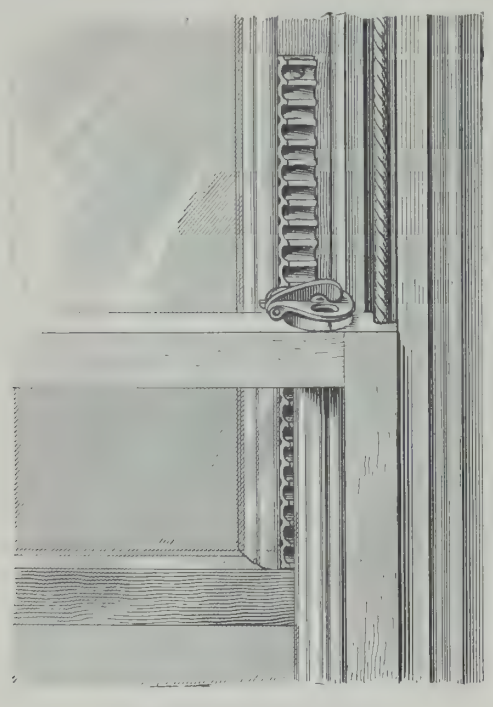
THE "CAPITOL" HEATER.

"Warmth for Winter Homes," which contains a great many valuable points about heating apparatus, and also a full description of the heaters named.

AN IMPROVED SASH LOCK.

The cut illustrates a sash lock that fastens the sashes while either tightly closed or open at any preferred point, in a positively burglarproof manner, and prevents their movement in the frame, thus securing proper and thorough ventilation of the room, and freedom from the annoyance of a rattling window. It is made by Irving, Elting & Co., Saugerties, N. Y., and it is so simple in mechanism, and its action so perfect, that a child can understand it, and readily lock or unlock it. The different relative positions in which the sashes may be locked

while either raised or lowered, or both, are at distances of three-eighths of an inch up to ten inches, the full limit of safety. The Elting sash lock has no springs, and there

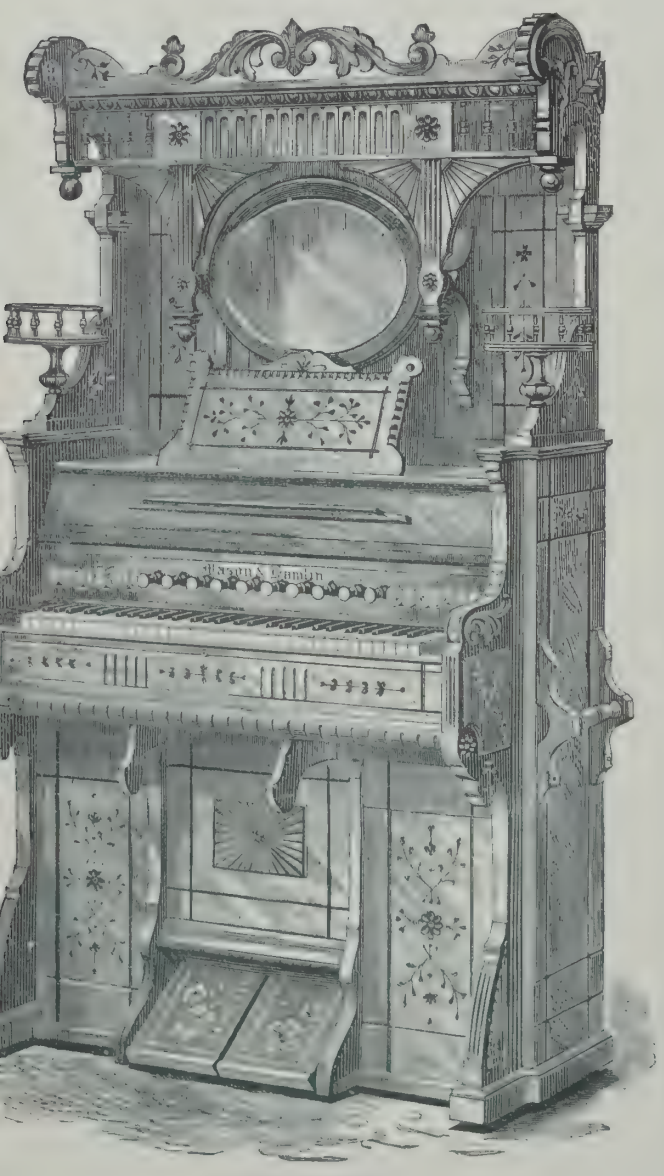


THE ELTING SASH LOCK.

is nothing about it to get out of order, wear out, or break. It is attached same as the ordinary fastener, no mortising being required.

AMERICAN HOMES AND THE CABINET OR PARLOR ORGAN

Either as an auxiliary of the pianoforte in the drawing-room, or occupying an important place in the music room of our beautiful homes, the American Cabinet Organ, manufactured by the Mason & Hamlin Co., is highly prized. For nearly thirty-five years these instruments have maintained a high place in public favor, as is evidenced by the fact that during this time nearly two hundred thousand of them have been sold, the sales extending not only to all parts of this country, but to all civilized nations of the world. These instruments may now be said to be nearly as perfect as human hands can make them. At all the great world's exhibitions, when in competition, since and including that of Paris in 1867,



PARLOR ORGAN.

they have been found worthy of the highest distinctions for demonstrated superiority in true musical quality of tone, in variety of combination and solo effects, in proportion, uniformity of scale, convenience of mechanical arrangements, and other excellences in all the most important qualities generally.

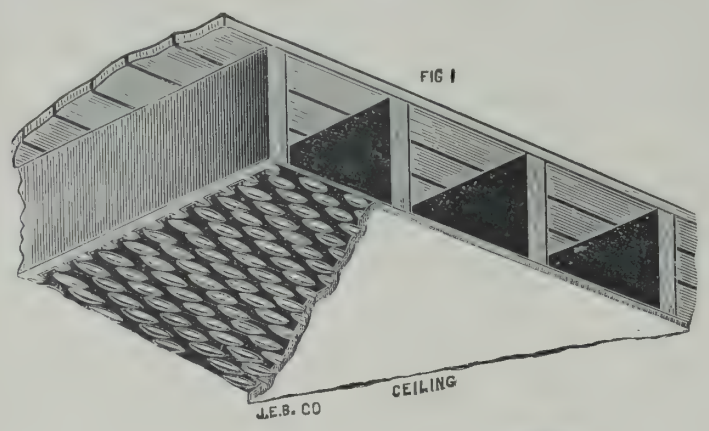
The illustration presented herewith, a parlor model, is one of the finest and handsomest double reed organs ever put on the market, having the latest *fin de siècle* design, a beautifully decorated and carved case, swinging mirror (new idea) of French plate, dainty and useful bric-à-brac shelves, piano fall-board (another innovation), handles, etc. The design of this case has received a patent, it is so unique. The reputation attained in these instruments for thoroughness of workmanship, and material and elegance of cases, has only been exceeded by their high qualities as musical instruments.

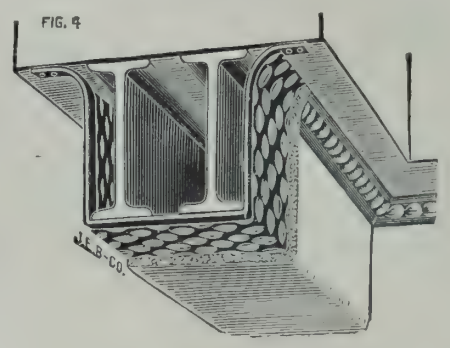
The architects and home builders should not fail to avail themselves of the advantages of dealing with a house of such established reputation, nor fail to make a place especially designed for convenience and adaptability in music room, parlor, or drawing-room, for the American Cabinet Organ. Especial and exclusive designs may be obtained to correspond with interior or decorative finish by calling on or addressing the manufacturers, Mason & Hamlin Co., 146 Boylston Street, Boston, Mass.

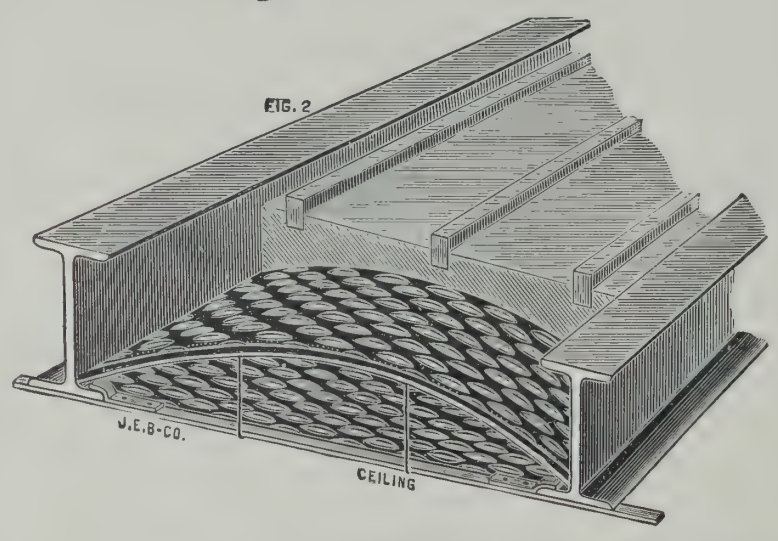
THE LAURIE STEEL LATH.

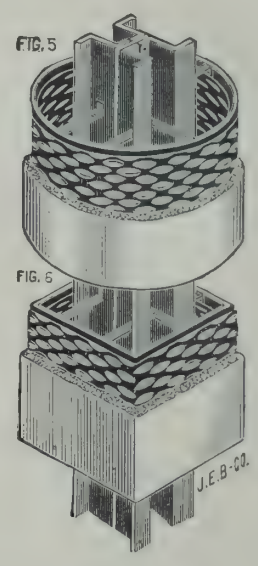
Economy of space and material for partition walls, in the construction of fireproof buildings, is receiving careful consideration by our best architects. The old method involves a waste of material, increased weight and expense, with nothing gained, but rather an absolute loss of money and room, which is a money earner in all buildings. Solid partitions, 1½ inches thick, made with the Laurie Metal Lath as the mortar holder, is one of the greatest economizers of space and cost that we know of where numerous partitions are required, as in office buildings, flats, etc. The accompanying illustrations show some of several ways of employing the Laurie lath, made at the J. E. Bolles & Co.'s iron works, Detroit, Mich. Fig. 1 shows the steel lath used in connection with wood joists, without furring. Fig. 2 shows ceiling construction with I-beams and concrete filling. The curved sheet of metal lath rests upon iron bars, 12-inch centres, and will carry all the weight required, as these bars are varied in size, according to the span and load. Iron furring bars are also used for ceiling, which are attached to I-beams and supported between by suspension wires. Fig. 4 shows how iron or wood girders are covered by using light iron brackets, to which the lath is attached. Heavy cornices of various shapes are built up in the same manner. Figs. 5 and 6 show round and square columns, built up with the Laurie lath by means of iron bands, studded off from the columns, as shown.

These partitions are built upon iron studding, placed 16-inch centres, to which the lath is secured by means of wires, and is plastered upon both sides alike. This lath is manufactured at one operation as rapidly as a board passes through a planer. The metal is not weakened by the process, as is often the case with other lath. On the contrary, it is strengthened, as the alternated lipped apertures act as a stiffener to the sheet, and make it at once both flat and rigid, without depression or corrugation, which requires extra mortar to fill, without adding to their fireproof features. This lath has stood the most severe fire test, and proven itself to be an effectual barrier to the spread of fire in a conflagration. It has a double key, viz., one on the face side, formed by the lip around the opening, as well as on the back. There are no sharp edges in the openings to cut the key of the mortar, and it can be curved or bent into various shapes for cornices, columns, etc., without injury to the key. It is quickly put on, as it comes in flat sheets, and is applied directly to the joists or studding without furring, and forms a true surface, free from waves or buckles. Another important feature of this lath is its adaptability for electric light wiring. It always comes painted, and is kept in stock in sheets 24x48 inches, crated ready for shipment. Parties interested should correspond with the manufacturers.





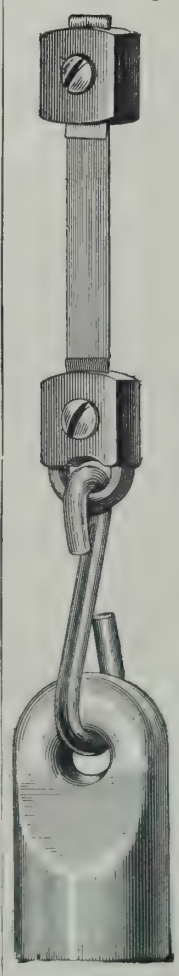




FIREPROOFING WITH THE LAURIE STEEL LATH.

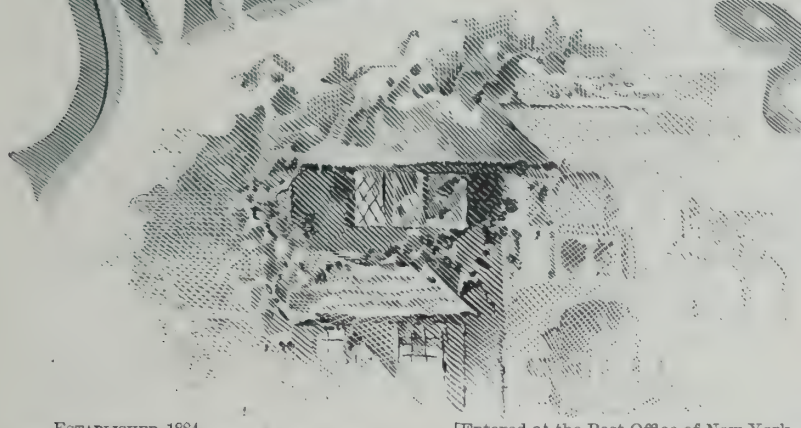
THE AUSTIN & EDDY SASH HANGING ATTACHMENT.

The cut below shows an attachment, which has just been gotten up by Austin & Eddy, of Boston, for securing sash ribbon to the weights and sash in hanging balanced windows. A patent has been applied for on this improvement. A metal sash ribbon takes the place of the sash cord in common use, and is used in connection with the sash pulleys, wheels being grooved and shaped specially to carry the ribbons. This method of hanging sash has been in use to some extent for several years, but some mistakes have been made in the application, though the general idea is most excellent. We understand a high grade of metal only in the ribbon affords the best results. The ribbon is used in connection with a novel attachment which will, without injury to the ribbon, effectively secure it to the sash and weights. It is claimed that in this attachment all previous faults have been overcome, that it is simple, and convenient to apply, that no injury is done to the ribbon, weakening its holding powers, and that the hold on the ribbon is positive. Sash hung according to this improvement, with due care and attention to the conditions, should last in satisfactory use the lifetime of the house builder.



THE STANLEY WORKS, of New Britain, Conn., and 79 Chambers Street, New York, in their beautiful new catalogue, just issued, present full details of the large and very superior line of goods made by them, in the way of wrought steel butts, door bolts, blind trimmings, link belting, wrought strap and T hinges, trunk hardware, handles, escutcheons, etc. All of the goods made by this firm are of standard quality, and builders and house furnishers may be sure that all articles of their make are as represented, and equal, if not superior, to any other goods with which they may be compared.

SCIENTIFIC AMERICAN



Building Edition.

ESTABLISHED 1884. [Entered at the Post Office of New York, N. Y., as Second Class matter. Copyright, 1895, by Munn & Co.] PUBLISHED MONTHLY.

Vol. XX. No. 4 NEW YORK, OCTOBER, 1895. Subscription, $2.50 a Year. Single Copies, 25 Cents.

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A COTTAGE AT ROCHELLE PARK, N. Y.—See page 50.

Scientific American.

ESTABLISHED 1845.

MUNN & Co., Editors and Proprietors,

No. 361 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

NEW YORK, OCTOBER, 1895.

THE

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SCIENTIFIC AMERICAN, BUILDING EDITION.

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A COTTAGE AT ROCHELLE PARK, N. Y.

We present, on pages 49 and 52, a pleasing design for a suburban residence, recently erected for Mark Klaw, Esq., at Rochelle Park, New Rochelle, N. Y. The building stands on a very prominent point, overlooking the park and surrounding country, and it has a broad, low, well shaded piazza, porte-cochère, and look-out at third story. The plans, though irregular, show many unique little corners, which give a most pleasing effect to the interior. The underpinning is built of rock-faced Ohio limestone, of a light gray color. The superstructure above is of wood, and it is covered on the exterior with cedar shingles, and left to weather finish, while the trimmings are painted bottle green. Roof is shingled similar, and finished natural. Dimensions: Front, 45 ft.; side, 40 ft; not including piazza and porte-cochère. Height of ceilings: Cellar 7 ft.; first story, 10 ft. 6 in.; second, 10 ft.; third, 9 ft. Entrance to hall is through a "Dutch" door, with stained glass windows on either side. This hall and the interior throughout are trimmed with whitewood, and finished natural; the former contains an ornamental staircase with carved newels, and it is lighted by a stained-glass window with excellent effect. The fireplace is built of brick, with tiled brick hearth and facings, and an oak mantel with mirror. Drawing-room contains an open fireplace, with tiled hearth and facings, and an oak mantel. Dining-room, octagonal in shape, is furnished with a buffet, built in, china cabinet, and fireplace built of Tiffany brick. The kitchen and pantries are wainscoted, and are provided with all the best modern fixtures complete. The second floor contains five bedrooms, large closets, and bathroom, the latter being wainscoted and furnished with exposed plumbing. Third floor contains billiard room, smoking room, two bedrooms, and two trunk rooms. Cemented cellar contains furnace and other necessary apartments. Heated by the Mahoney hot water system. Cost $9,000, including furnace and everything complete. Mr. H. S. Rapelye, architect, Mount Vernon, New York.

Our engravings are made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT KENNEBUNKPORT, MAINE.

We present on page 53 a residence recently erected for B. S. Thompson, Esq., at Kennebunkport, Maine. The design is treated in the English style of architecture, half timber and stone, and the engravings show one of the most attractive and picturesque residences along the coast. It is situated on a point of rocks, with a commanding view of the ocean and Cape Porpoise. The stonework is built of shore rocks, and are laid up at random. The gables are ceiled up, and painted white, while the trimmings are painted bottle green. The shingle work is round-butted, like tiling, and is painted a tile red. The roof is shingled, and painted similar. Dimensions: Front, 45 ft.; side, 53 ft. 6 in., not including piazza and terrace. Height of ceiling: Cellar, 8 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. Hall, reception room (Porpoise view) and drawing-room are trimmed with white pine, and painted China white in a delicate manner. These apartments are generally connected, as may be seen by the plan, and are finished with wood cornices, and fluted columns of the Ionic order, supporting an archway, and forming an arcaded effect. Hall contains an ornamental staircase, with oak steps and risers, and balusters and newel, painted same as trim. Parlor is provided with a massive mantel, with columns, and the fireplace is built of red brick, and the hearth is paved with red tiles. Reception room is provided with a paneled divan, placed beneath a large 6 by 8 ft. plate glass window. Dining-room is trimmed with oak, and it has a paneled wainscot, ribbed ceiling, and an open fireplace built of brick, with tiled hearth and facings, and an oak mantel. Kitchen and pantries are well fitted up with the usual fixtures, and are wainscoted with narrow beaded stuff. The doors on first floor are veneered with oak, and the floors are laid with similar wood, and highly polished. The second floor contains four bedrooms, bathroom, and maid's bedroom and bath. These rooms are treated in delicate colors, are well lighted and ventilated, and are provided with large closets. The bathrooms are furnished with the best modern fixtures. There are three bedrooms on third floor, and also a trunk room. Cemented cellar contains furnace, laundry, and other apartments. The house is supplied with gas, water, electric lights and bells. Mr. Henry Parton Clark, architect, Studio Building, Boston, Mass.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT FLATBUSH, N. Y.

We publish on page 57 the attractive suburban residence of George Lucas, Esq., located at Flatbush, L. I. The view shows a broadly treated exterior, the generous projections being very effective, corner bay breaking through overhanging gabled roof, and forming tower, which has small dormer, having arched window and sash, neatly divided. There is a well shaded entrance porch, dormer above, with triple window and balcony. Underpinning is of wash brick, capped with light stone. Exterior framework above sheathed, papered, shingled, and left to weather. Dimensions: Front, 28 ft.; side, 37 ft. Heights: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. Reception hall has seat at staircase, having wide landing in bay, ornamental newel and turned balusters, all in whitewood. Parlor, in cream, of good size, having bay its full width, angle fireplace, and connecting with dining-room by sliding doors. This room also has an angle fireplace and a square bay; nook, with pointed bay, with seat. Butler's pantry has sink and dresser, and is means of passage from dining-room to kitchen, complete with the usual fixtures, and pantry. Second floor plan shows four chambers, with closet accommodations and bathroom, with best exposed plumbing. Attic has two rooms finished off. Finish throughout, except where noted, white pine, natural. Cellar, cemented, contains heater, fuel bins and storage space. Cost $4,000. Jno. J. Petit, architect, Brooklyn, N. Y.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

COTTAGE AT MOUNT VERNON, N. Y.

On page 55 we present an all shingled cottage, at No. 22 Thirteenth avenue, Mount Vernon, N. Y. The design is effectively treated in the Colonial style, having an octagonal corner feature, with pointed roof and main, gabled roof, running forward to veranda line, and there supported by four slender Tuscan columns; a wide dormer relieves the great expanse of roof. Dimensions: Front, 29 ft. 6 in.; side, 42 ft. 6 in., inclusive of all projections. Heights: Cellar, 7 ft. 6 in.; first story, 9 ft. 6 in.; second story, 9 ft.; attic, 8 ft. Underpinning of local stone, laid at random, all above being sheathed, papered, shingled, and left to weather. First floor plan shows reception hall, having stairs with turned balusters and ornamental newel sliding doors to parlor, with angle fireplace, the flue of which is carried over to kitchen breast, only one chimney then being required. Dining-room connects with kitchen, having usual fixtures, through pantry. Second floor plan is divided into four chambers and bathroom. One room finished in attic. Cellar, cemented, contains cold room, heater, fuel bins and toilet. Louis Herbert Lucas, Esq., architect, Brewster building, New York city and Mount Vernon.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A SUBURBAN COTTAGE.

Our view and floor plans on page 56 represent the residence of F. S. Bainbridge, Esq., on Avenue A, near Ocean Avenue, Flatbush, L. I. The design is interestingly treated in the Colonial style; has a well-shaded entrance porch, with slender Tuscan columns, supporting a pediimented roof above. Octagonal bay runs the two stories in height, and is finished with rail above. An ombra opening is worked in at the corner; the hipped roof is relieved by front gable, with large mullioned window, and the dormers; frieze band is ornamented with composition festoons. Chimneys of brick, corbeled, and capped with stone. Underpinning of brick; exterior framework above, sheathed, papered and clapboards, painted yellow, at first story; all above, shingled and left to weather; trimming color, cream. Dimensions: Front, 33 ft. 8 in.; side, 59 ft., including porch. Heights: Cellar, 7 ft.; first story, 10 ft.; second, 9 ft.; attic, 8 ft. The plan shows a convenient arrangement of rooms; vestibule, with wide doors, opens on reception hall, having wide staircase of easy rise, with ornamental newel and turned balusters, all in ash; sliding doors to parlor, with bay full width, and fireplace; library connects with dining-room through sliding doors, and has bay with wide mullioned window; butler s pantry is means of communication with kitchen, and contains dressers, etc. Kitchen contains usual fixtures, including three wash trays. Second floor plan shows three chambers, with good closet accommodation; study and bath room, with plumbing all exposed, and fixtures of good make. Attic has one room finished off. Cellar, cemented, contains heater, fuel storage, etc. Trim, except where noted, whitewood. The work throughout this house is of the best, and the cost complete was $8,000. Messrs. Rowe & Baker, architects, New York City. J. C. Sawkins, builder, Flatbush, L. I.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

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A DWELLING AT GLENWOOD, YONKERS, NEW YORK.

The engravings, page 54, illustrate a private residence which has been erected for Luther Jones, Esq., at Glenwood, Yonkers, New York. The building is situated on Warburton Avenue, overlooking the Hudson River and Palisades. It is designed in the most unique manner, and it is built of the best materials, and in a thorough, workmanlike manner. The underpinning is built of local granite, and the chimney breast is built of similar stone. The exterior walls are filled in with brickwork between the lath and sheathing, while the exterior framework is sheathed, and then covered with shingles, and stained a mahogany color. Blinds and trimmings are painted bottle green. Roof shingled, and painted red. Dimensions: Front, 31 ft.; side, 45 ft., not including piazza. Height of ceilings: Cellar, 8 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. The interior is trimmed and finished in a handsome manner. The floors are laid with oak, and highly polished, in the principal rooms. The windows are glazed with French plate glass. Hall is trimmed with quartered oak. It is lighted by a stained glass window with good effect, and contains an ornamental staircase, with carved newel posts. Parlor is trimmed with Mexican mahogany, and it has spindle transoms and an open fireplace, with tiled hearth and facings, brass trimmings, and a massive mantel, with beveled plate mirror, and elegantly carved. Dining-room trimmed with quartered oak, and is provided with a bay window and fireplace, with tiled trimmings and an oak mantel. Sliding doors separate these rooms. Butler's pantry and kitchen are trimmed and wainscoted with whitewood, and finished natural. These apartments are furnished with the usual fixtures in the best possible manner. The second floor is trimmed with whitewood, and treated in china white. It contains two bedrooms, library, large closets and bath-room, while the third floor contains two bedrooms trunk room, and ample storage. Bathroom is fitted up with porcelain tub and exposed plumbing, all nickelplated. Cemented cellar contains laundry with porcelain tubs, furnace room, and other necessary apartments. Messrs. D. & J. Jardine, architects, New York City.

Our engravings were made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT NEW ROCHELLE, N. Y.

We publish, on pages 58 and 59, a residence erected for A. L. Lankota, Esq., at New Rochelle, N. Y. The building is situated on a very commanding site in Rochelle Park, overlooking the Sound, and the design is well treated, giving good elevations, which are well broken with a spacious piazza, porte-cochère, tower and chimneys, which are ornamental in themselves. The underpinning and first story are built of brown sandstone, and the second and third stories are covered with shingles, and left to weather finish, while the trimmings are painted bottle green. The roof is shingled also, and painted red. Dimensions: Front, 52 ft.; side, 45 ft., not including piazza and porte cochère. Heights: Cellar, 7 ft. 6 in.; first story, 10 ft.; second, 9 ft.; third, 8 ft. 6 in. Hall and lobby are trimmed with oak. They have paneled wainscotings and ceiling beams. Hall contains also a very large open fireplace, built of brick and stone, with tiled hearth and hardwood mantel. The staircase is a very handsome one, with carved newel posts, and it is lighted by two windows, glazed with stained glass, which sheds a pleasing light over upper and lower halls. The drawing room and library are trimmed with gum wood. The former contains a corner cabinet and an open fireplace, with tile trimmings and mantel, and the latter is provided with a similar mantel, book-cases, and paneled divan, built in to correspond with trim. Dining room is trimmed with butternut, and has a fireplace, mantel, and buffet, with stained glass window over. The floors are of hardwood, and highly polished. The kitchen and pantries are wainscoted, and trimmed with whitewood, finished natural, and are furnished with the usual fixtures complete. The second floor contains four bedrooms and bathroom, besides two servant bedrooms, with private stairway to kitchen. Bathroom is fitted up complete, with exposed plumbing. Third floor contains billiard room, handsomely fitted up, cedar closet and trunk room. Cemented cellar contains furnace and other necessary apartments. Messrs. Stephenson & Greene, architects, Temple Court, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

RESIDENCE AT MOUNTAIN STATION, N. J.

On page 60 we illustrate the residence of Carman R. Runyon, Esq., at Mountain Station, N. J. The design is successfully treated in the Colonial style; broad, well-shaded veranda, with Tuscan columns of good proportion and detail; grouped, and supporting roof over; central entrance feature has rail and balcony above. All bays running up the two stories are flat, tin-roofed, and form balconies. Dormers relieve the lines of the gabled roof. Dimensions: Front, 41 ft.; side, 30 ft. 6 in., for body of house, exclusive of bay and veranda projections. Heights: Cellar, 7 ft.; first story, 10 ft. 6 in.; second, 9 ft. 6 in.; attic, 8 ft. Underpinning and piers of Belleville stone, white mortar joints; exterior framework above sheathed, papered and covered with white cedar shingles, left to weather; roof of gray slate; blinds painted green; trimming color, white. Entrance door of oak, glazed; leaded side lights. Reception hall, of good size, is trimmed in quartered oak, has an open fireplace of brick, with breast running to ceiling; broad staircase, with landing having ornamental newel and three turned balusters to the tread; broad opening to parlor having angular bay and fireplace, in pale blue tile, and mirror back; walls covered with pale blue cartridge paper; finish, white and gold; sliding doors to dining-room; walls in light terra-cotta; finish, mahogany; angle china closet; butler's pantry with sink, dressers and staircases, and passage, also with dresser communicate with kitchen, having usual fixtures and large pantry. Second floor plan shows four chambers, and bathroom with fixtures complete; plumbing exposed. Attic has three rooms finished off, also trunk-room. Cellar, cemented, contains laundry, finished with plastering and wood floor; servants' toilet, hot air heater, and fuel bins. Harry C. Pelton, Esq., architect, No. 1 Madison Avenue, New York City.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A HOUSE AT NEW HAVEN, CONN.

We publish on page 61 a residence recently erected for P. E. Whalen, Esq., at New Haven, Conn. The engravings show a modern economical cottage design, with many good features. The lines are well broken, giving it a pleasing appearance. The underpinning is of brick. The exterior framework is covered with matched sheathing, and then shingled, and painted light gray, with similar trimmings. Blinds are painted bottle green. The roof is shingled, and stained a moss green. Dimensions: Front, 31 ft.; side, 35 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft 6 in.; third, 8 ft. The first story is trimmed with ash. Vestibule is paneled, and it has a floor laid with tiles. Reception hall contains an ornamental staircase, turned out of ash, with carved newel posts. It is lighted effectively by a stained glass window. Hall, also, is provided with an open fireplace, built of brick, and furnished with tiled hearths and facings, and a hardwood mantel. Parlor is separated by an archway, with a spindle transom. Dining-room has a swell bay window, and a nook for buffet. Kitchen and pantry are wainscoted with narrow beaded stuff, and provided with modern conveniences. Rear porch contains a large closet for ice-box. The second and third floors are trimmed with yellow pine, and finished natural. Second floor contains four bedrooms, closets and bathroom, while the third floor contains two bedrooms and ample storage. Bathroom is wainscoted, and provided with the usual fixtures and exposed plumbing. Cemented cellar contains furnace, and other necessary apartments. Cost $3,500, complete. Messrs. Stilson & Brown, architects, New Haven, Conn.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN

A COTTAGE AT BRONXVILLE, N. Y.

On page 62 we publish a cottage recently erected for Dr. H. E. Van Horne, at Bronxville, N. Y. The design is treated in the Colonial style. The underpinning and balustrade to piazza are built of local rock-faced stone, of a grayish blue color, and it is laid up in white mortar. The superstructure above is built of wood. The first story is clapboarded, while the second and third stories are shingled. It is painted Colonial yellow, with ivory white trimmings. The roof is shingled, and left to weather finish. Dimensions: Front, 42 ft.; side, 29 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in; second, 8 ft. 6 in.; third, 8 ft. The interior throughout is trimmed with Louisiana red cypress, finished natural, and the floors are laid with North Carolina pine, and polished. The hall is a spacious one and well lighted by stained glass windows. Parlor is provided with false fireplace, with tile hearth and facings and a hardwood mantel. Dining-room has a fireplace built of brick, and trimmed in a similar manner, and a bay window with a paneled seat. Kitchen is provided with wash trays, sink and a large pantry, fitted up complete. This apartment is wainscoted with narrow-beaded stuff. The second floor contains four bedrooms and bathroom. The latter is wainscoted, and furnished with the usual fixtures, with exposed plumbing. Third floor contains one bedroom, studio and trunk room. Cellar cemented, contains furnace. Cost $4,600, complete. Mr. W. H. Rahman, architect, Clark Building, Broadway and Ann Street, New York.

Our engraving was made direct from photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

Buff Brick.

Since buff brick and iron building frames came to be known the use of the old-fashioned red brick has been much curtailed. Nevertheless, red brick is still the most important building material in use in cities, as it is still by far the cheapest for ordinary structures. The buff brick took the place of the red pressed brick as a material for fronts, and hollow brick has taken the place of ordinary red brick as filling for walls framed with iron skeletons. The buff brick costs about the same as the pressed brick, and so has come to take its place in buildings of an expensive character. The buff brick has also driven out brownstone to some extent, though the latter still has a great vogue in apartment houses. This stone has in thirty years been deposed from its place as the chief ornamental material for expensive dwellings, and now is used to give a thin veneer of elegance to cheap structures. As thus used it is a flimsy material, because it is set with its lines of cleavage vertical, and is thus rapidly destroyed by the action of the elements. The Vanderbilt houses have walls of solid brownstone laid on its bed, as the phrase is, which means with the plane of cleavage horizontal. Thus laid the stone is fairly durable.

Buff brick has long been used in the West, chiefly because the clays in much of the region beyond the Alleghanies burn buff instead of red. It is the presence of iron that gives a red brick. Milwaukee used to send buff brick to New York, but most of the local supply now comes from New Jersey and Staten Island. The earliest important structure of buff brick in New York city was the Telephone building, in Cortlandt Street, and for some years Telephone brick was the name the material went by in the trade. The speckled bricks of that structure have been more popular than the somewhat pasty-looking smooth buff bricks. The speckles are obtained by grinding pig iron and mixing it with the clay. The speckled buff bricks are sometimes made extremely long and thin, when they are called Pompeian.

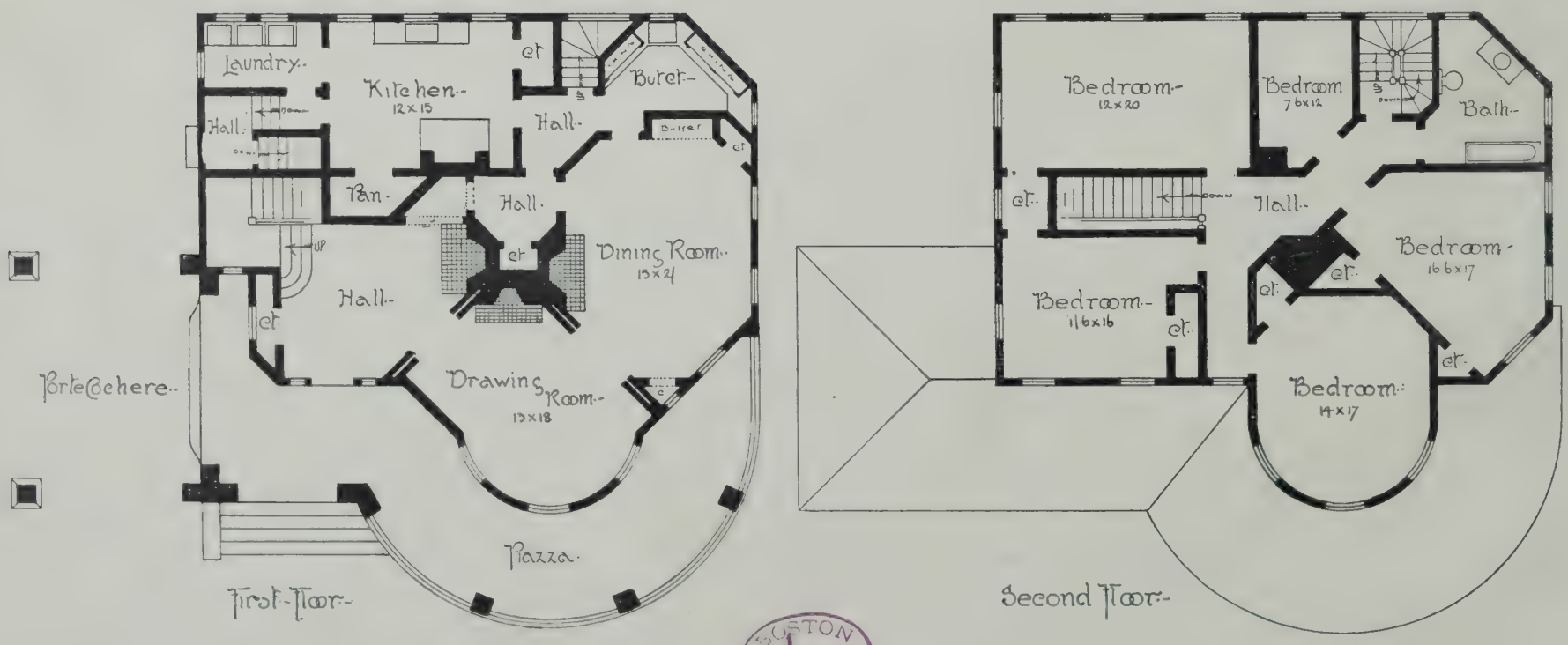
The buff brick is made of a fire clay, and is more durable than the red. It is notably more durable than the pressed brick for which it has been substituted, since the pressed brick, as the name indicates, is made under pressure, and has in consequence a tendency to flake at the surface. The most notable buff brick structure in New York is the Madison Square Garden, and the peculiar ornamental arrangement of the bricks in the tower has been imitated in humbler structures. Since the tower rose, several charity buildings, hospitals, and the like have been built of buff brick. Had the design of making offices in the tower been carried out, the public would have been made even more familiar with the structure, and doubtless the popularity of the buff brick would have been increased. When the plan of the offices, the clock, and the bell shall have been fulfilled, the tower and its material will be more popular than ever.

Builders and dealers in building material believe that the buff brick is to be a permanent and increasing conspicuous feature of New York architecture. Several considerable buildings of that material are now going up. The North Jersey fire clays, from which the buff brick is made, are seemingly inexhaustible, and the material can be brought to New York very cheaply. Some of the clays that lie near those used for these bricks are too valuable for ordinary building purposes, and are sent all over the country to be worked up for other uses. The crude clay is worth in some instances $100 a ton. If the buff brick can be reduced in price, its use will be greatly extended, because houses and office buildings of that material rent more easily than equally well situated buildings of other materials. Luckily for house owners, the mere cost of front brick, whether red or buff, is not an important item in the construction of a considerable building, so that even a slight reduction in the price of buff brick would probably greatly extend the use of that material.

There is a curious conservatism in the brick trade that helps, perhaps, to maintain the ascendency of the red brick. This conservatism is shown in the nomenclature of the trade, and especially in the survival of the shilling in the accounts of the brick maker, the canal boat men that carry brick, and perhaps even the consignee in this city. The builder, however, rejects the shilling and substitutes the dollar.

WE have long had slag paint and pavement, but the latest is a slag brick chimney. According to *L'Industrie* this plan was adopted by the Courrieres and Ortricourt companies, and their example is followed by the works of Arbel and Douai. The latter establishment planned a chimney 164 feet high and to weigh but 379 gross tons, about half the weight of a brick chimney of the same dimensions. A special cement was to be used which would bind together the blocks composing the chimney so firmly as to require no chain or iron band for strengthening. This is an interesting application of a cheap industrial by-product, which, should the experiments prove a success, will be appreciated by metallurgists.

IN the State of Washington the cheaper 16-inch red cedar shingles are so sawed that six butts measure two inches in thickness. In a higher-cost shingle five butts measure two inches. In the cheaper 18-inch cedar shingles five butts measure two inches, while in a slightly higher-cost variety five butts measure 2¼ inches in thickness.



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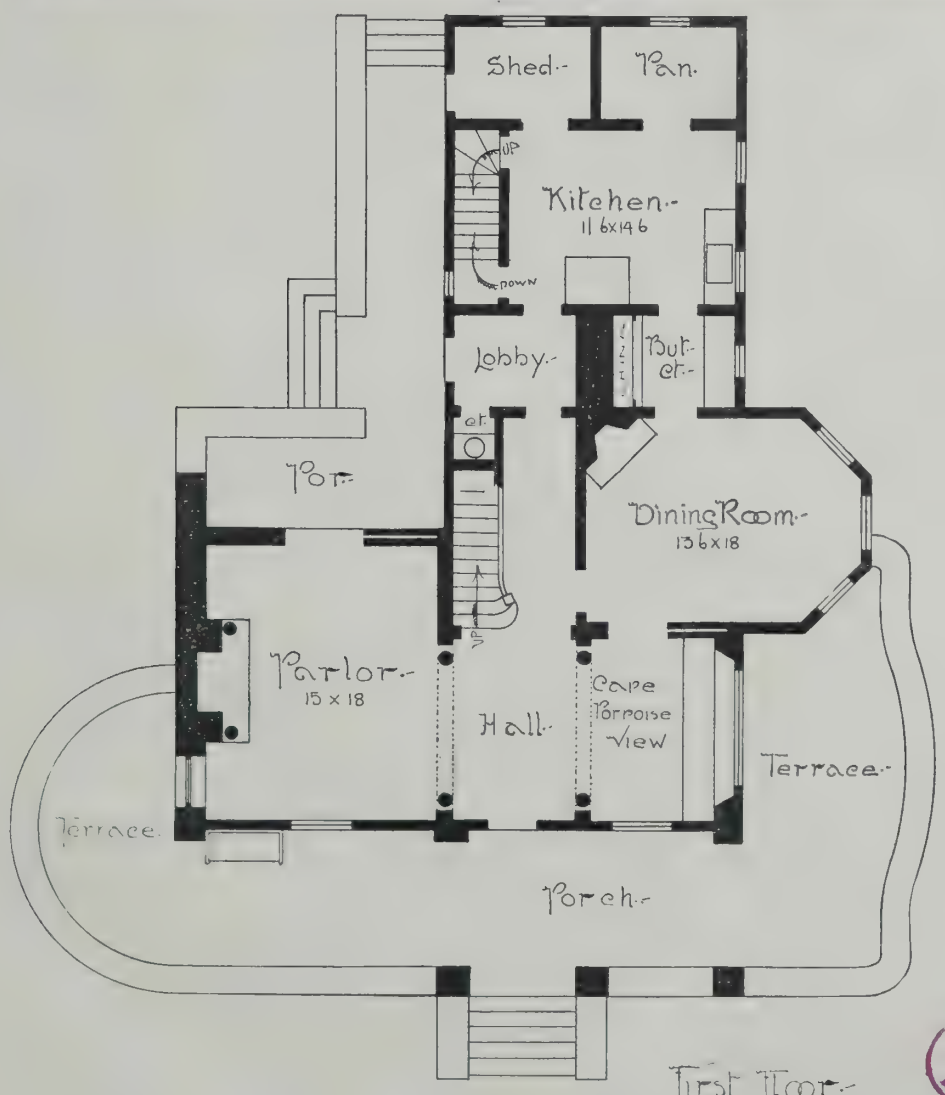
A COTTAGE AT ROCHELLE PARK, N. Y.—See page 50.



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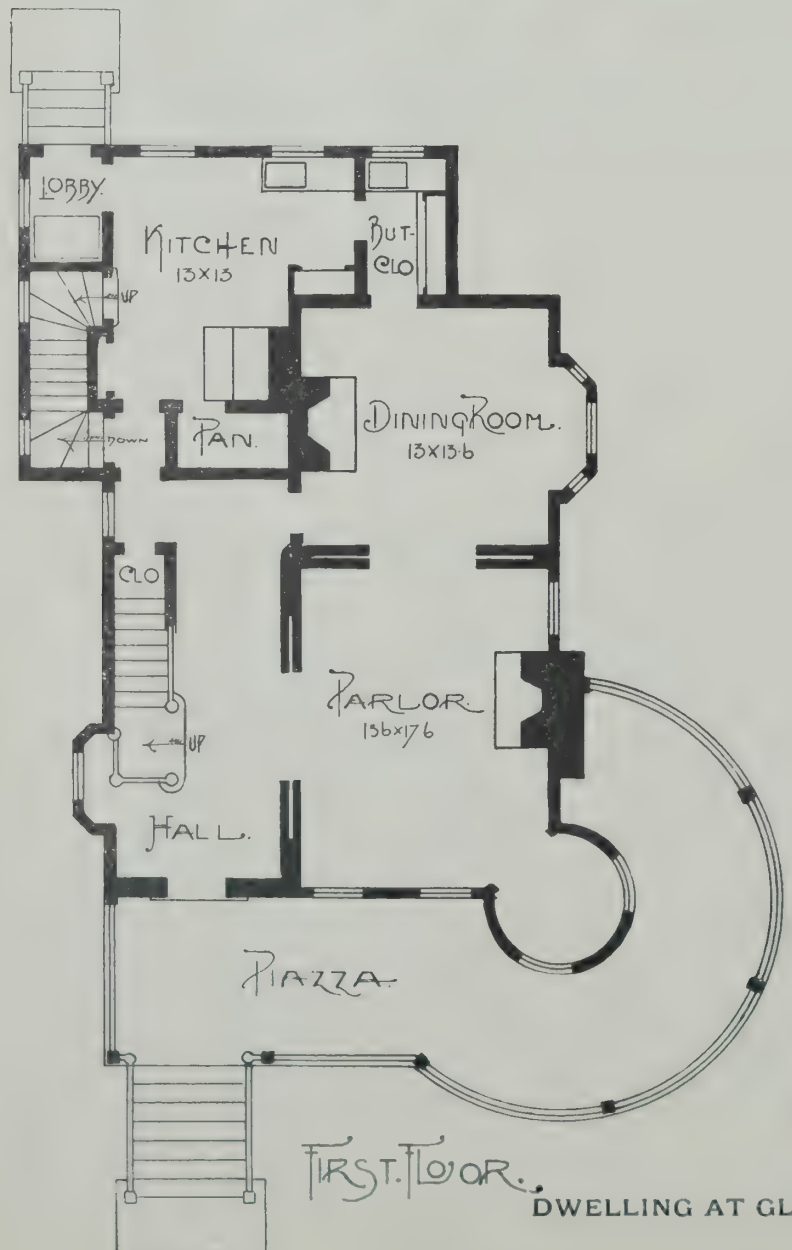
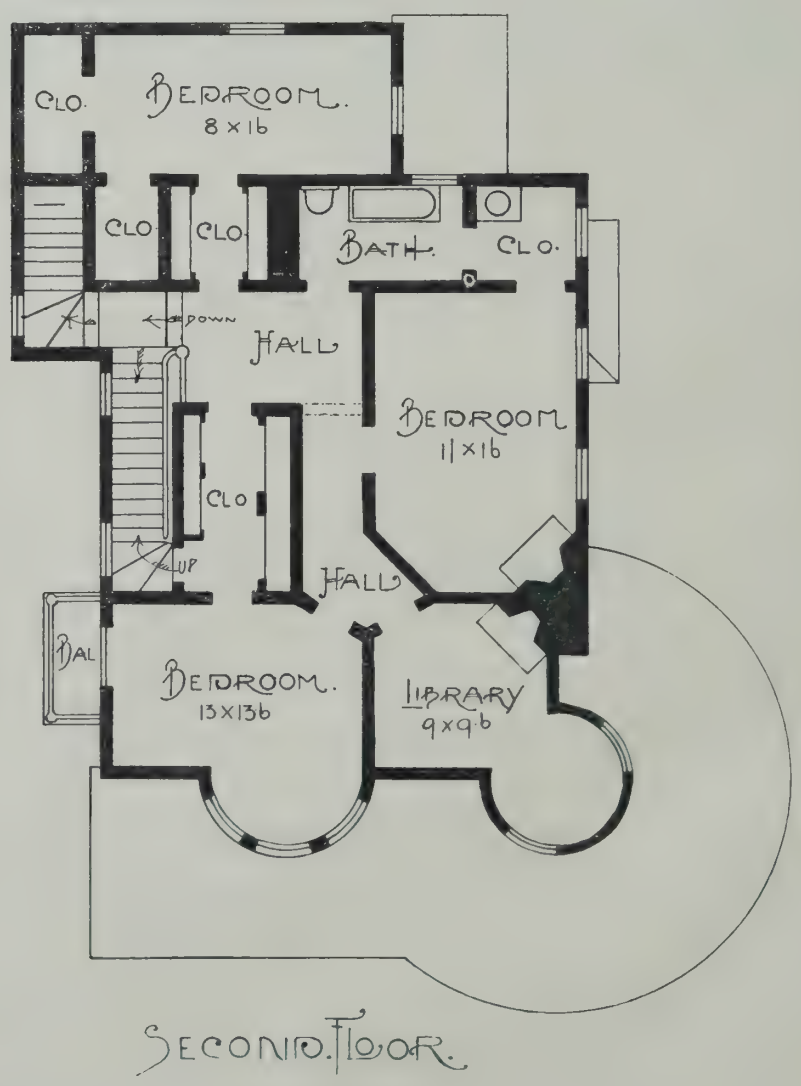
A COTTAGE AT KENNEBUNKPORT, ME.—See page 50.





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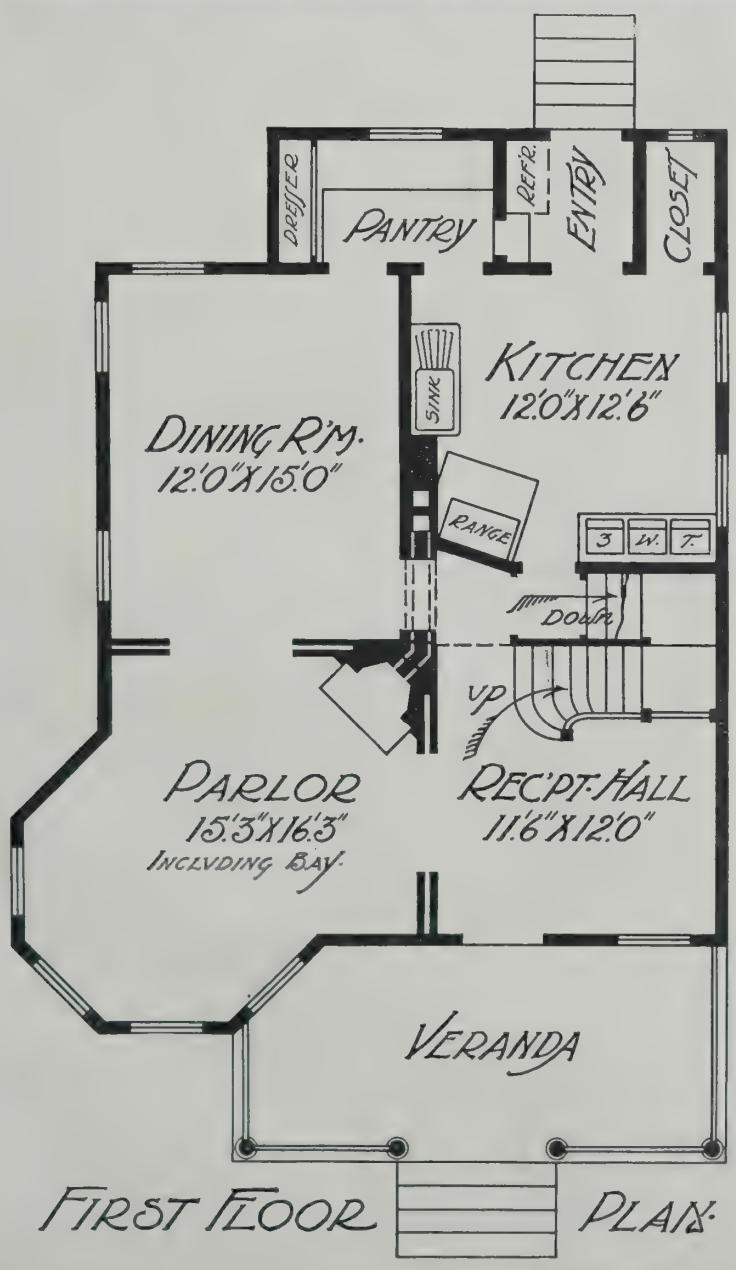
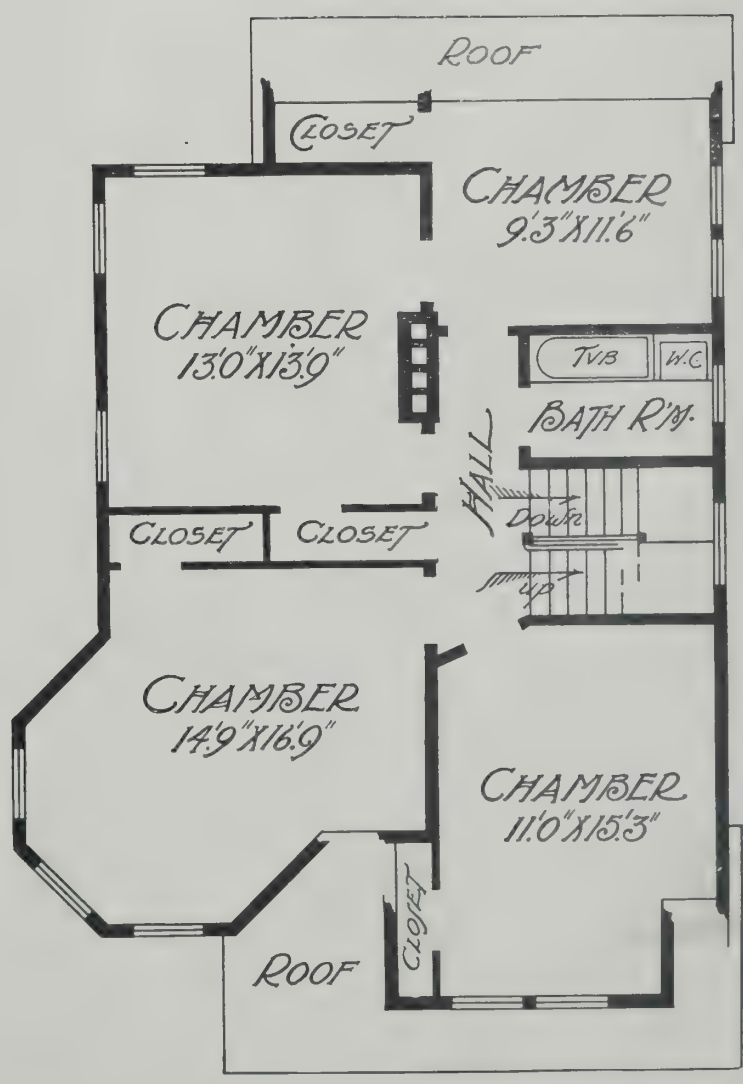
DWELLING AT GLENWOOD, YONKERS, N. Y.—See page 51.



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

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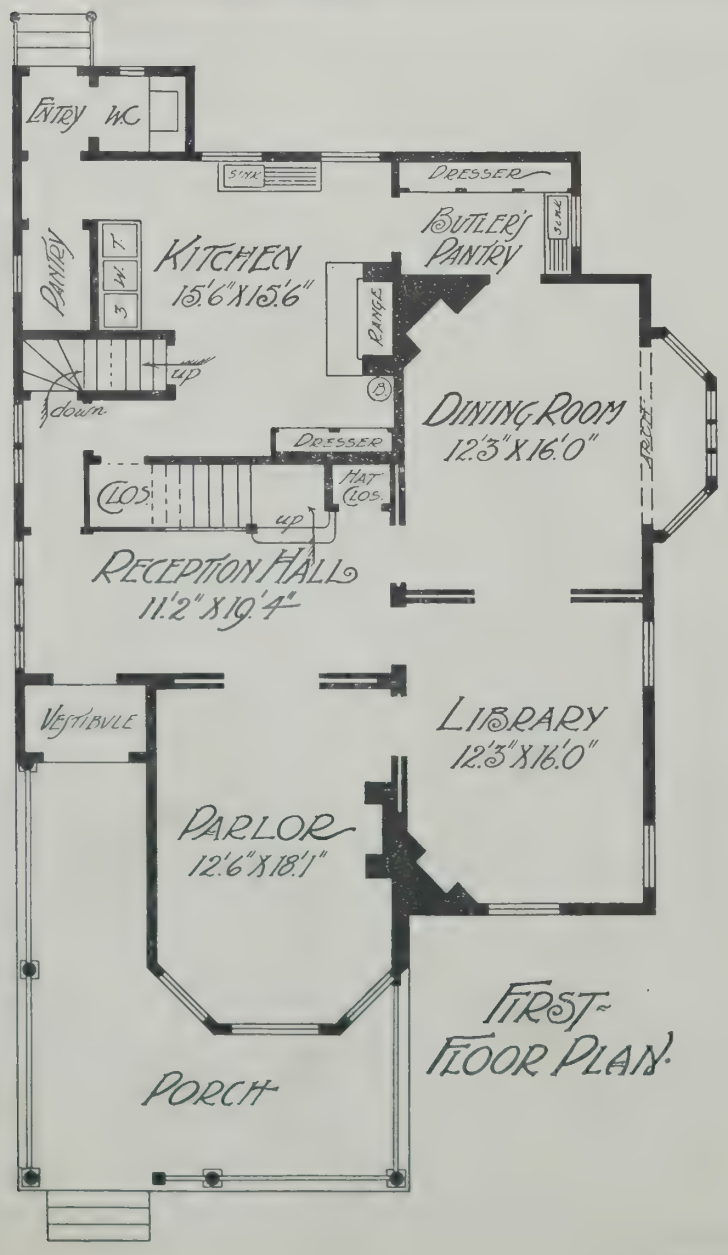
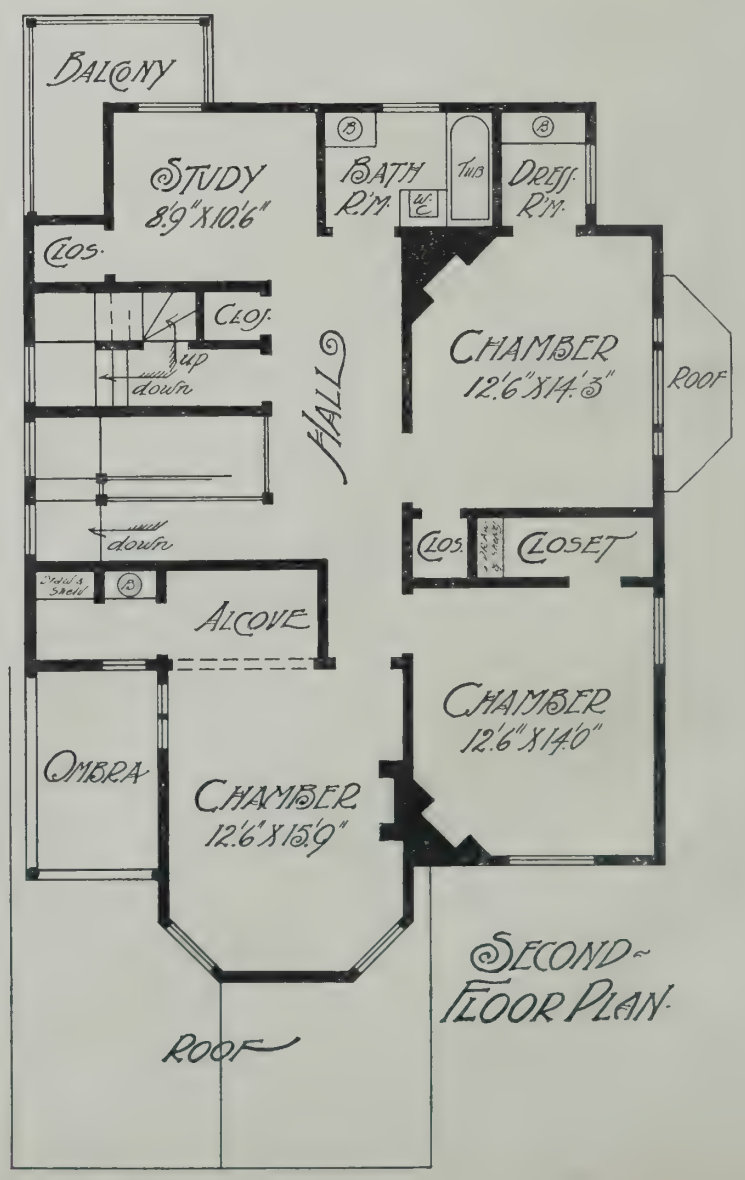
A COTTAGE AT MOUNT VERNON, N. Y.—See page 50.





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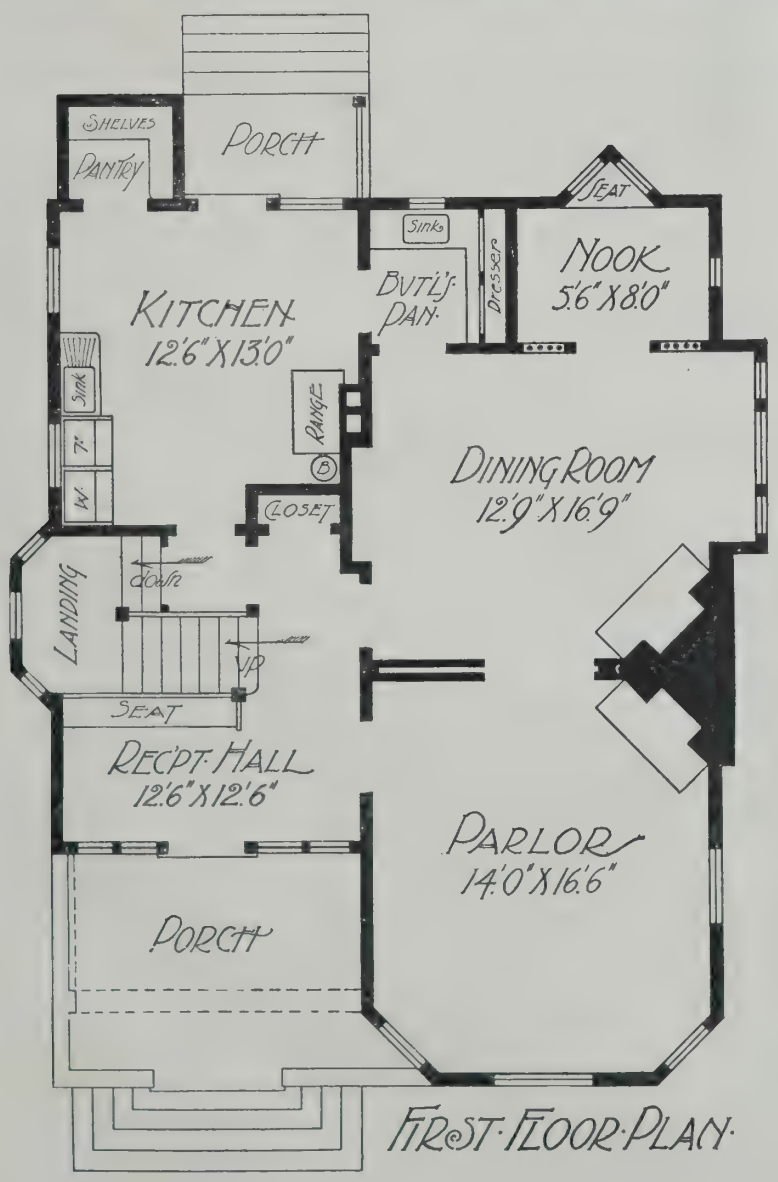
A SUBURBAN COTTAGE.—See page 50.



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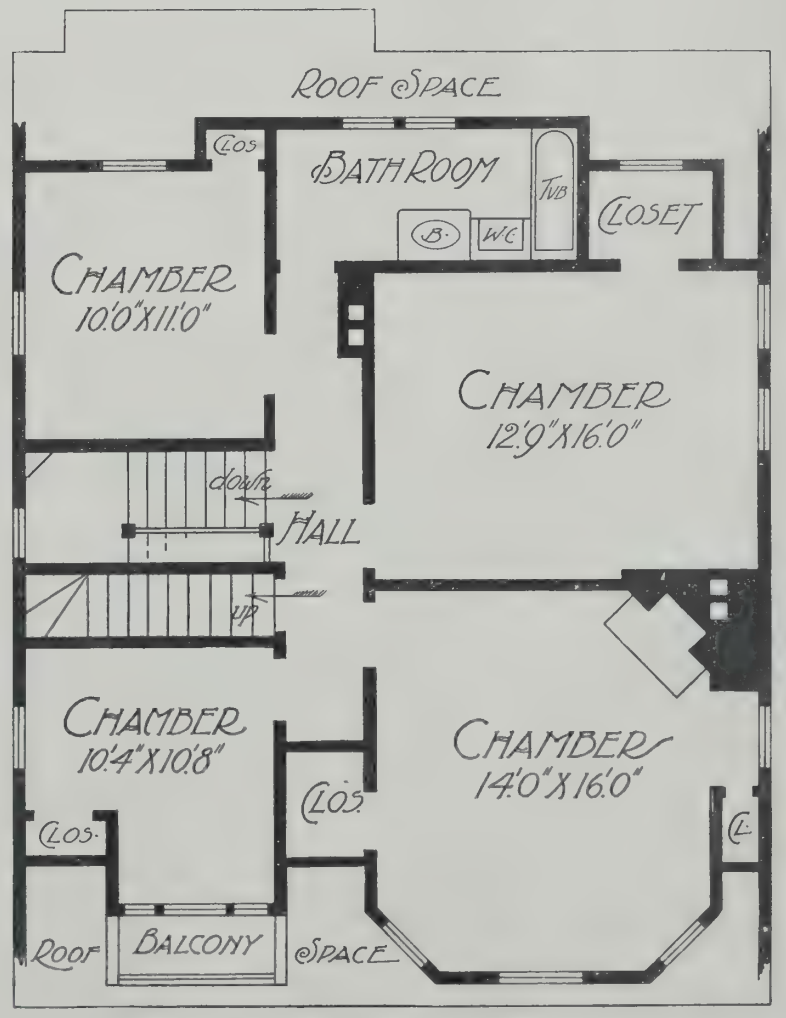

SECOND FLOOR PLAN.

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A COTTAGE AT FLATBUSH, N. Y.—See page 50.

A RESIDENCE AT NEW ROCHELLE, N. Y.—See page 51.

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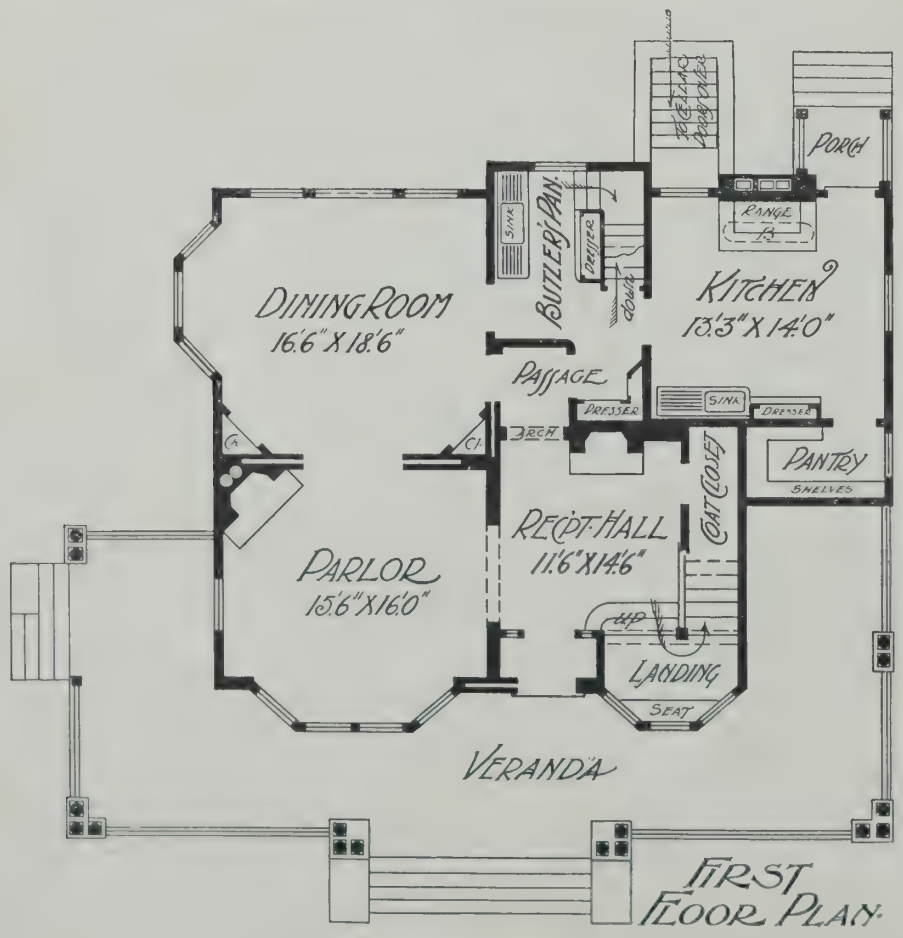
A RESIDENCE AT NEW ROCHELLE, N. Y.—See page 51.



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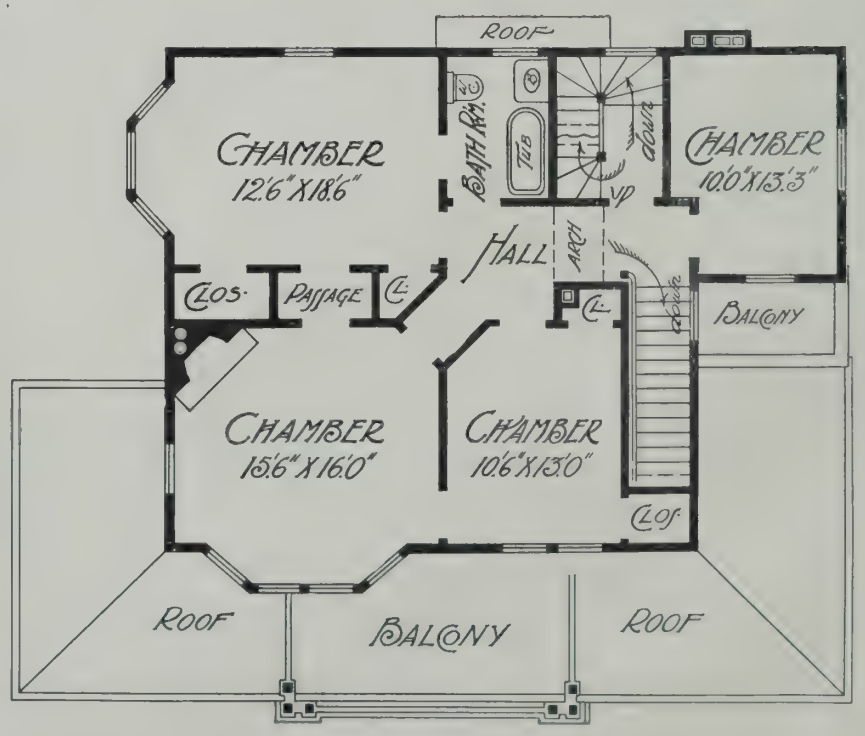

SECOND FLOOR PLAN.

A RESIDENCE AT MOUNTAIN STATION, N. J.—See page 51.

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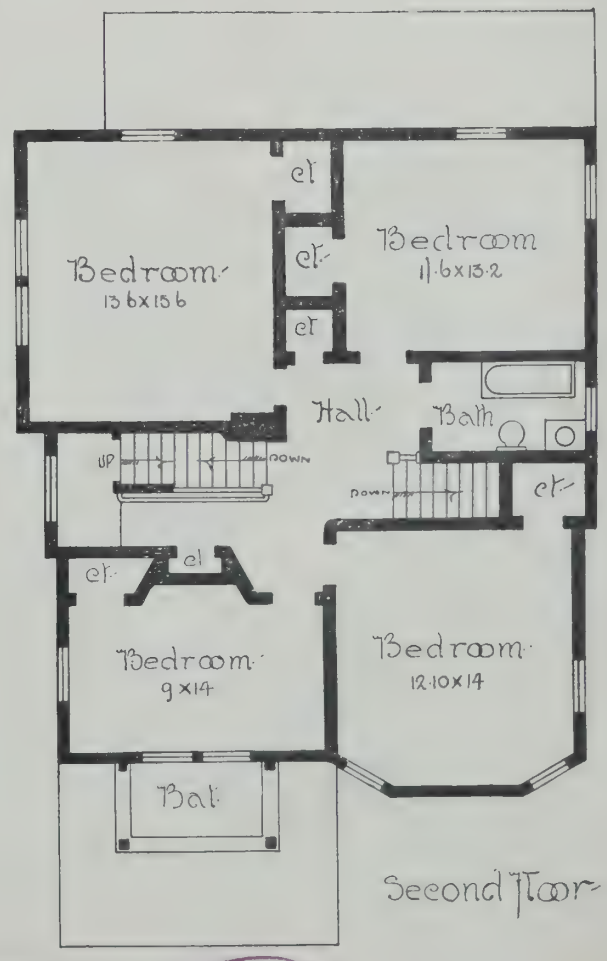

A HOUSE AT NEW HAVEN, CONN.—See page 51.

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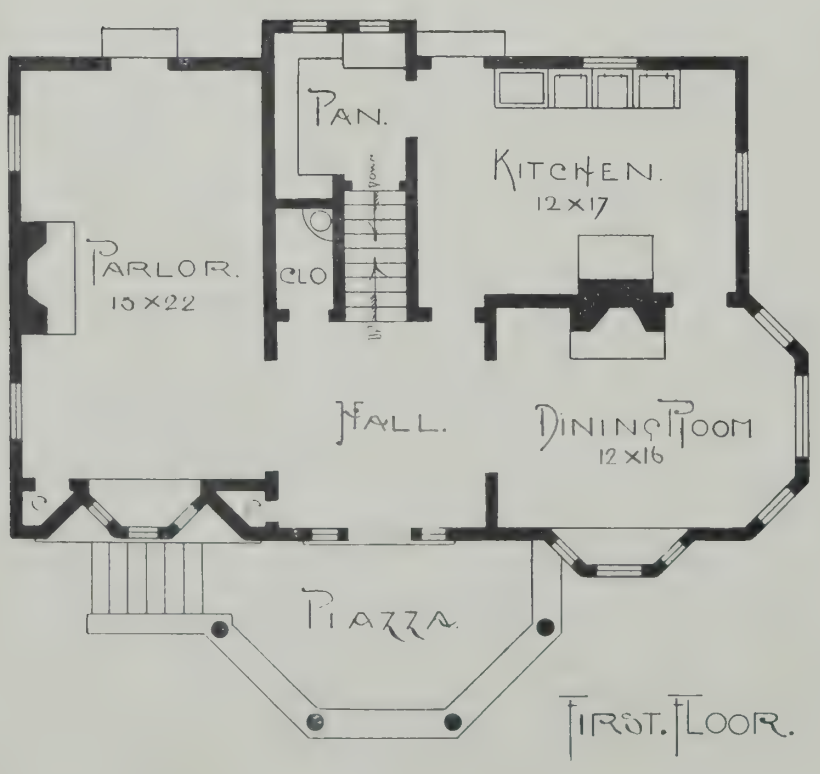

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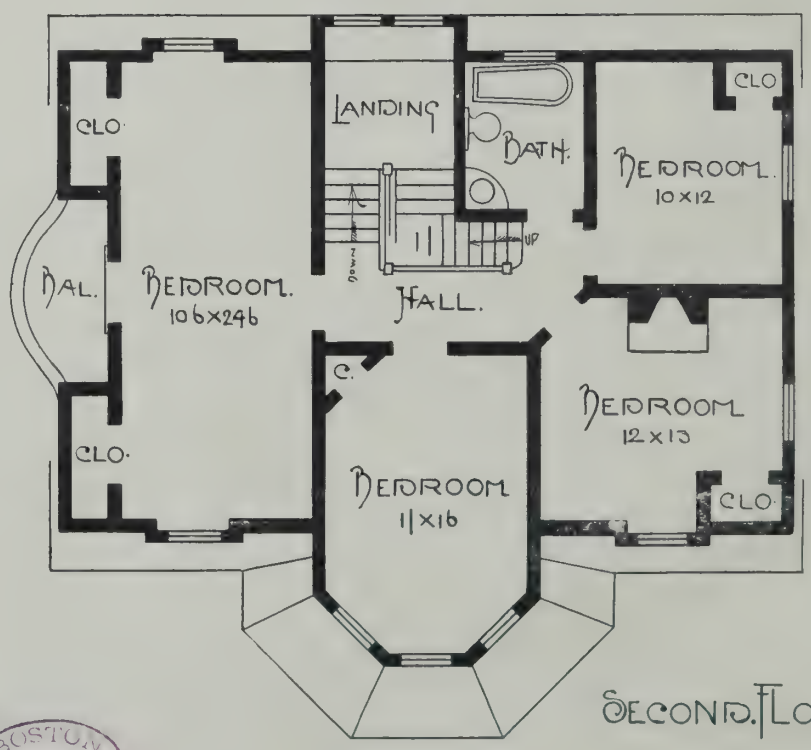

SECOND. FLOOR.

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A COTTAGE AT BRONXVILLE, N. Y.—See page 51.

TOWER TANKS FOR WATER WORKS.

The illustration represents a means of furnishing a water supply for communities of considerable size, and one which also affords great advantages for many industrial establishments. The simplicity, safety and comparatively moderate cost of these tower tanks have led to the erection of large numbers of them within quite a recent period, the light and strong metal structure, presenting but little surface to the wind, being greatly preferred to the former cumbrous wooden towers, always needing something in the way of repairs. The tower tank shown in the accompanying illustration, erected for water works purposes at Jenkintown, Pa., a suburb of Philadelphia, is 36 feet in diameter and 16 feet high, the tower itself being 125 feet high. It was erected by George J. Burkhardt's Sons, of Philadelphia, a firm which has been established since 1840, and which has attained a wide reputation for its cedar vats, tanks and reservoirs, which the firm manufacture in sizes varying from 100 to 100,000 gallons capacity, for all purposes for which tanks or reservoirs are required. The steel hoops with which the tanks are bound are figured to be able to withstand a pressure at least three times as great as they will have to bear when the tanks are full, over 4,000 pounds of steel being used in the hoops of the tank shown in the illustration. and some 9,000 feet of lumber.

THE JENKINTOWN (PA.) WATER WORKS TANK.

An Old Baltimore Firm.

S. B. Sexton & Son is the style of one of the oldest and best known stove firms in the State of Maryland. The business was established in 1839, by S. B. Sexton, Sr., and has been successfully carried on to this time. The stoves, furnaces, and ranges made by this firm are of strictly first quality and scientifically constructed; meeting the requiremen's where good heating, cook'ng, and economy in the use of fuel are co sidered. It has been an effort of th's firm, also, to blend artistic effect in their goods, so as to please the eye as well. Mr. S. B. Sext n, Sr., was the progenitor and originator of the celebrated Baltimore firepla e heater. Mr. S. B. Sexton, Jr., entered the firm as partner in the year 1874, and by his efforts a new impetus was given the business, by introducing new patterns, enlarging and expanding the field of operations.

In 1889, Mr. S. B. Sexton, Sr., sold his interests in the business to his son, and it was in this year that the business of the house became so great as to necessitate larger plant and storage room. In 1892, additional works were erected to meet the increased demand for their goods.

Compo-Board instead of Plaster.

As a substitute for lath and plaster in a building, the Northwestern Compo-Board Company, whose post-office address is Lock Box 999, Minneapolis, Minn., afford an article in their compo-board with which a carpenter can finish a house ready for painting, the house being, it is claimed, warmer in winter, and cooler in summer, than it can be made by any other wall lining. The compo-board is made in sheets, four feet wide, and the wall boards are cut of a length to go from floor to ceiling, the ceiling boards going clear across the room the way the joints run. With this material, there is no waiting for plas er to dry, no dampness, and the wall is perfectly smooth and solid. The compo-board may be readily applied to an old ceiling or wall, and is susceptible of decoration with oil or water colors, wall paper, lincustra walton, or any form of plastic relief.

Translucent Fabric—A Glass Substitute.

A fabric of wire cloth, covered with translucent impervious material, especially adapted for skylights, roofs, etc., is manufactured by the Translucent Fabric Co., 64 Federal Street, Boston. It will not crack or break, and is absolutely weather and water proof. The wire cloth forming the body of the fabric is of steel meshes, twelve to the inch, and this is covered by an elastic material as translucent as skylight glass. Live coals falling on it will not set it on fire. Including cost of construction translucent fabric skylights can be furnished cheaper than those of glass.

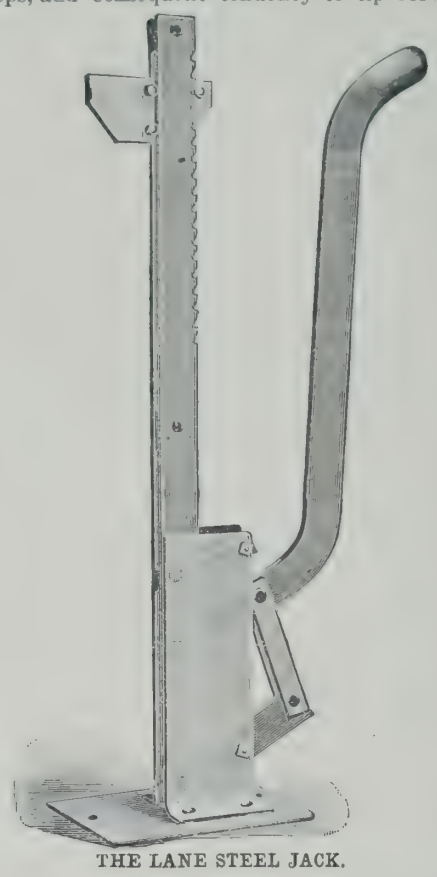
Ventilation and Heating of School Buildings.

The above is the title of a handsome, elegantly bound book of 76 pages, being Catalogue No. 83 of the B. F. Sturtevant Co., of Boston. It makes plain the necessity of artificial ventilation, describing the good results obtained thereby, and sets forth in full detail the plan of the Sturtevant system, which has been brought to a high state of perfection within the last twenty years. It is a treatise which should be in the hands of every member of a board of education and every school principal throughout the country. It also contains illustrations of many high schools and other buildings in which the Sturtevant apparatus is installed.

Ornamental Glass.—The Matthews Decorative Glass Company, New York, have an immense establishment, one of the first and the largest of its kind in the country, where they manufacture almost every variety of ornamental glass for church, house and miscellaneous decorative purposes. They are the originators and patentees of decorative clipped glass, and their latest production, styled "Rientique glass," is designed to exhibit all the beauties of the most delicate art glass, at half the cost. The most complicated designs of leaded art glass can be produced in rientique, as the glass is made by brushwork treatment, as in oil painting. This glass is made in solid lights, that will not develop leakages. Samples of this glass are furnished to architects and builders.

A LIGHT AND STRONG LIFTING JACK.

The accompanying illustration represents a style of steel jack, recently brought out, in which the carriage jack is made wholly of steel. It is simple, strong and compact, the lifting bar being a double column, between the two parts of which is the vertically adjustable lifting piece, doing away entirely with the ordinary objectionable steps, and consequent tendency to tip forward or backward. The peculiar compound levers are also very effective. The makers, Messrs. Lane Brothers, Poughkeepsie, N. Y., have had large experience in the manufacture of steel goods, having at an early day successfully placed upon the market a steel barn door hanger. They were also pioneers with an all steel parlor door hanger, both of which are now well known throughout the United States and Canada.

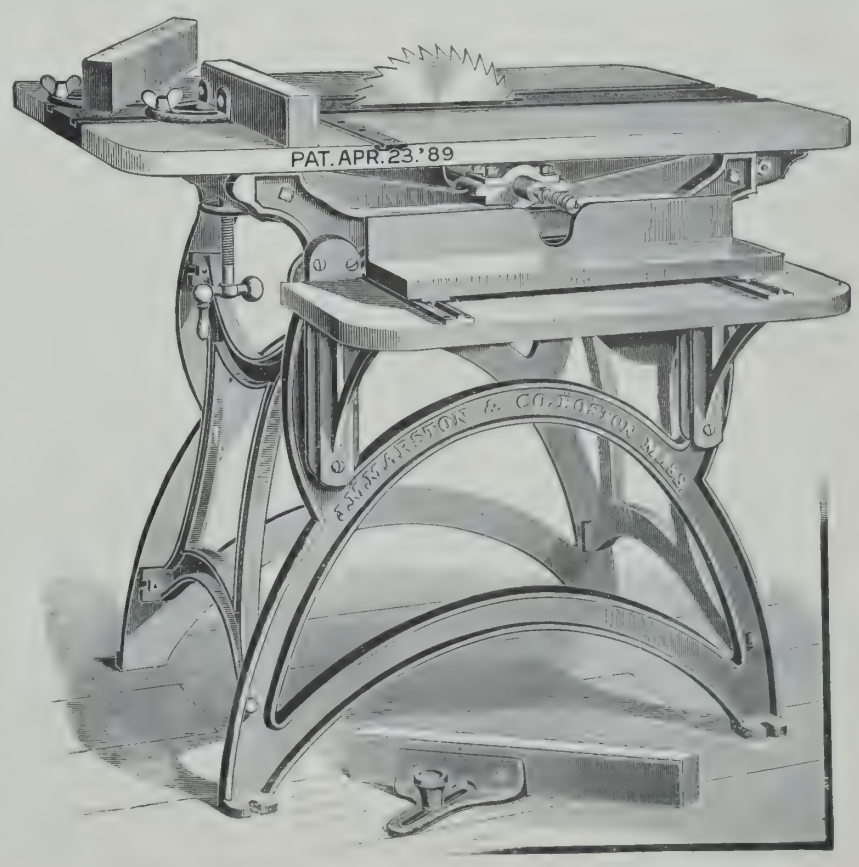


THE LANE STEEL JACK.

AN IMPROVED CIRCULAR SAW.

The saw represented in the illustration has a frame entirely of iron, of a design that gives great strength. The centre shaft, actuated by treadle or crank, has a 20 inch cut gear, meshing into a 2 inch gun metal gear on the saw arbor, and 4¾ inch gear on the lower shaft, which carries a 23 inch balance wheel, weighing 40 pounds, affording sufficient momentum to carry the saw steadily through the work, and the saw having a speed ten times greater than the driving shaft. The shafts are of Bessemer steel, accurately lathe turned, and the gears are accurately cut by automatic machinery. The treadles are of wrought iron, and the cranks have extension handles that can be adjusted to different lengths of stroke. The table is 28 inches wide by 37 inches long.

Further information may be obtained by addressing the manufacturers, J. M. Marston & Co., 199 Ruggles St., Boston, Mass.



MARSTON'S No. 1 HAND AND FOOT POWER CIRCULAR SAW.

IMPROVED WOOD WORKING MACHINE.

The machine shown in the engraving is an important addition to an already large list of working sash, door and blind machinery made by a well-known Cincinnati firm, forming a valuable labor-saving tool in mortising sash rails, relishing sash, doors and blinds, and recessing the rail for end of blind rods. It is constructed of iron and steel, in substantial and compact manner, and so designed that the various kinds of work may be performed without interference each with the other.

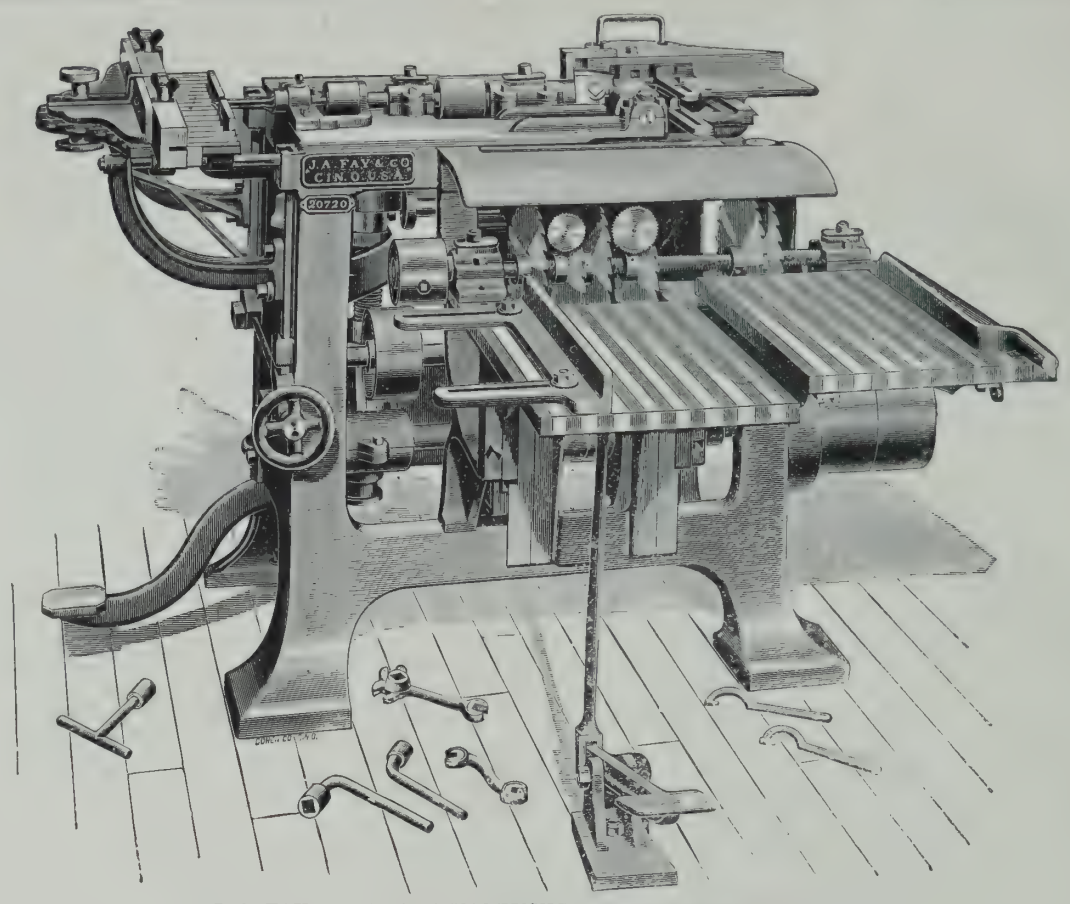
The meeting and bottom rails of sash are mortised by one operation, and the chips are cleaned out, leaving the work ready to put together. This is accomplished by means of a hollow chisel, encasing a revolving boring bit, all supported in a stationary frame. The work on the table is carried forward to the chisel by means of powerful feeding mechanism, and is stopped instantly on removing the foot from the treadle. Different depths of mortises are made by changing the stroke of the pitman. The fence is provided with stops, and after being set no laying-off on the work is required.

Door relishing is accomplished by means of six saws, adjustable for different widths of work. The table has a vertical adjustment, by means of a treadle, and is provided with a stop, to regulate the depth of the relish. Sash and blind relishing is accomplished without interference, either with the mortising or door relishing. At the rear of the machine is located a spindle and cutter head, and a table is provided, which slides on planed ways, and is fitted with suitable stops for gauging the length and depth of relishing; a boring bit, revolving at the end of the cutter head, removes the stock that cannot be reached by the cutter head because of the projecting moulding. A chip breaker, with independent adjustment, is furnished for the relishing head.

The attachment for wedge cutting consists of a steel spindle, carrying two saws; a table, adjustable to and from them, and provided with stops for gauging the depth of the work, and for preventing the table from being moved into the saws. A guard is provided with the saw, as a protection to the operator.

The recess for blind rod is routed at the same time the blind rail is relished, by means of a vertical spindle and routing cutter, raised to the work by a foot treadle. The spindle has a lateral adjustment, by means of hand wheel and screw.

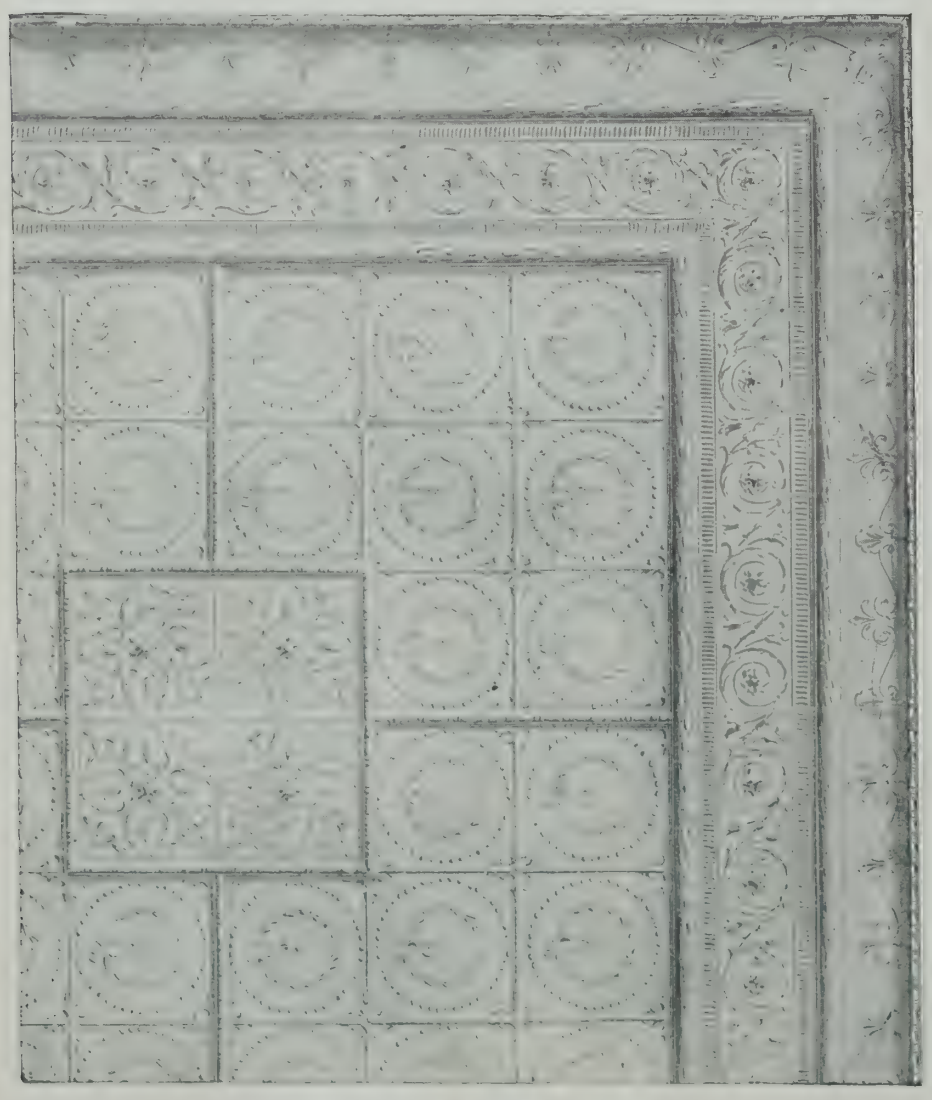
This machine is manufactured by J. A. Fay & Co., 297-317 Front Street, Cincinnati, Ohio.



J. A. FAY & CO.'S No. 1 MORTISING AND RELISHING MACHINE.

STAMPED STEEL CEILINGS, SIDE WALLS AND WAINSCOTING.

The ceiling shown in the illustration is composed of field and centrepiece panels, divided by embossed moulding, with Renaissance border, shell cove cornice, and embossed foot moulding, there being also embossed foot moulding between the field and border and the border and cornice. It is one of many beautiful designs appearing in a recent catalogue of Messrs. Moeslein & Crane, of No. 44 East Forty-second Street, New York City, who manufacture such ceilings, side walls and wainscoting, in ornamental and plain designs, in large variety, for all classes and styles of buildings. They are readily applied to steel or wooden beams, and are especially adapted to cover old plaster or wood ceilings. They are seamless, water-tight and fire-proof, and, when desired, are specially made from architects' drawings. They are also made, when required, of tin plate, copper and brass, although steel of suitable gauge is usually preferred, being less expensive and most durable. They do not ordinarily appear like metal ceilings, but afford a correct reproduction of stucco relief work, although of far more lasting quality than is ever possible of attainment with other forms of wall and ceiling embellishment



AN ORNATE STAMPED STEEL CEILING.

THE Cortright Metal Roofing Company have recently issued a new catalogue, descriptive of their special products, namely, metal slates, Victoria shingles, ridge coping, hip covering, valleys etc. It will be furnished on application, and doubtless will interest any one connected with roofing materials. The Company's main office is located at No. 50 North 23d Street, Philadelphia, and the Western branch at 134 Van Buren Street, Chicago, Ill.

Spring Hinges.

Bommer Bros., of 355 Jay Street, Brooklyn, N. Y., make the "Bommer" compound spiral spring hinge in all the finishes known to the hardware trade, including wrought steel, bronze, or brass, as well as in cast metal. They have lately listed two new low priced finishes, unpolished steel plated to antique copper, and unpolished steel plated to plain copper. These goods, while of handsome appearance, can be sold at about half the cost of the same hinges fully polished. Among other new finishes brought out by the firm are sand blast on bronze, brass and steel goods, and goods plated on steel, to resemble antique copper, silver, bronze, antique brass and dull brass.

THE Cream White Brick made by the Powhatan Clay Manufacturing Company, of Richmond, Va., have been sought after for some of the fine structures in New York City. They have been used in a double residence on Lenox Avenue, in a large Broadway building, and in a handsome and very unique building of the Fire Department. The new office building, corner of Broadway and Howard Street, is to be faced with these bricks. It is claimed that these bricks are very superior in texture and appearance, and that they do not turn green.

Mallory's Standard Shutter Worker and Fly Screens.

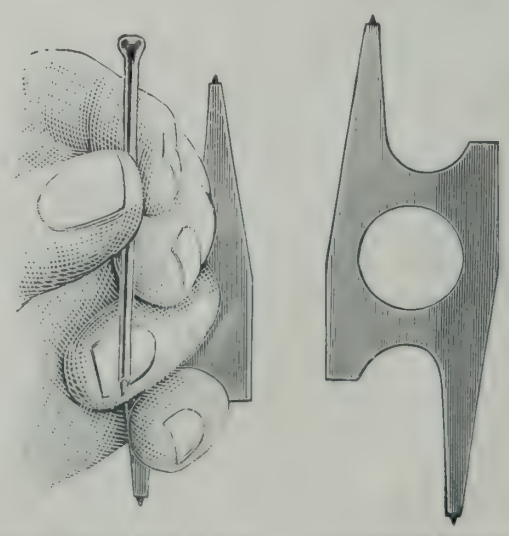
These articles are designed to go together, as the shutter worker helps to exclude the flies, etc., and the screens make the exclusion perfect, simply because it is not necessary to raise the screens in order to adjust the blinds so as to properly shade the window. They are made by the Mallory Manufacturing Company, Flemington, N. J.

Any one who has screens in his house knows how annoying it is to have a few stray flies get in the room, and wonder how they get there, when he has screens on his doors and windows. The answer is simple enough: You have raised the screen to adjust the shutter, some time during the day, in order to properly exclude the sun; or, what is more often the case during the summer months, you have noticed a storm coming up, and, it being too warm to close the window sash down, you have raised the screen in order to close the blinds, so as to prevent the rain from beating into the room.

Every one knows that just before an approaching rain is the worst time of all to raise the screens, as the flies are always driven to a place of shelter by the approach of a sudden storm, and will stick around the window, only waiting for you to close the shutters in the old-fashioned way, so as to give them the chance of entrance into the room.

AN IMPROVED NAIL SET.

Any one will readily understand from the illustrations the simplicity and the adaptability of this nail set to the most important uses for which such an implement is desired. It is manufactured by the Storm Manufacturing Company, of Newark, N. J., is double-headed, and has a "diamond point," to prevent its slipping. It is made of tool steel, the points turned and thoroughly tempered. The manufacturers, for 25 cents, send a sample by mail.



HOW NAIL SET IS HELD AT WORK. SIDE VIEW OF NAIL SET.

THE "NEW IDEA" NAIL SET.

SCIENTIFIC AMERICAN

Building Edition.

ESTABLISHED 1884. [Entered at the Post Office of New York, N. Y., as Second Class matter. Copyright, 1895, by Munn & Co.] PUBLISHED MONTHLY.

Vol. XX. No. 5. NEW YORK, NOVEMBER, 1895. Subscription, $2.50 a Year. Single Copies, 25 Cents.

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A RESIDENCE AT WAKEFIELD, N. Y.—See page 66.

Scientific American.

ESTABLISHED 1845.

MUNN & Co., Editors and Proprietors,

No. 361 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

NEW YORK, NOVEMBER, 1895.

THE

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Of the November number of the

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A RESIDENCE AT WAKEFIELD, N. Y.

Our illustrations on pages 65, 67, 76, 77 and 78 represent the interesting residence of J. P. Cranford, at Wakefield, N. Y. The design is successfully treated, and extremely appropriate to its surroundings. Dimensions: Front, 58 ft.; side, 60 ft. 4 in. Underpinning of stone. First story of buff brick and rock-faced stone, light gray in color, with joints well broken; cut stone head and sills; sparrow pecked stone water table. Structure above sheathed, papered, shingled, and left to weather. Chimneys of brick, capped with stone. Trimming color, cream white. The principal features of the exterior are the broad, well shaded piazza at front and side, with grouped columns of good proportion and detail, having yellow pine piece above, and supporting the overhanging gambrel roof. Three dormers relieve the great expanse of main roof in front, while numerous others, as well as eyebrows, are introduced at side and rear. The triple-arched entrance feature, of brick, with decorated terracotta soffit, and caps to piers, opens on tiled vestibule, with Dutch entrance door, of oak, to hall, trimmed in same wood (quartered), having hardwood floors, and buff brick fireplace, corbeled out for hood, with decorated terracotta panel. The main staircase also in oak, with maple balusters of special design; same are turned to form newel. Seat in recess at landing. Arched door to wine closet in maple. Dining-room, in oak, has central fire, place, in buff brick, corbeled out for pilastered mantel above. Ceiling paneled off in oak, with plaster tinted pale blue. Conservatory, containing about 400 square feet, at side. Library, also, with wide fireplace and seats, has square central bays, and is finished in white enamel. Butler's pantry provided with sink and dressers. Kitchen, with usual fixtures. Laundry, with tubs. Cold room, surrounded by brick walls, adjoins pantry, having generous dresser room. Dumbwaiter at back stairs. Second floor plan shows four chambers, principal one having dressing-room, and two with fireplaces, and all with ample closet accommodations. Sewing-room, with high chest of drawers, and four servants' rooms, one being bath. All plumbing throughout exposed; fixtures of best make. Most sash are casement hung, although some sliding have been used on first floor. Leaded and copper bars have been used to divide cathedral glass, mostly into diamond shape. Cellar, cemented, contains steam heater, fuel storage, etc. Ralph N. Cranford, Esq., architect, same address.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT MOUNT VERNON, N. Y.

The subject of illustration on page 68 is the residence of Bruce N. McQueen, Esq., on Rich, near Primrose Avenue, Mount Vernon, N. Y. The design is picturesquely treated in the Colonial style modified, having a broad, well-shaded front piazza, with slender Tuscan columns supporting balcony above, having shingled rail, with occasional introduction of balustered openings; ornamental frieze and dentil course runs around building, which is roofed with several gables. Dimensions: Front, 28 ft.; side, 39 ft. 6 in., including extension. Underpinning of brick, with bluestone sills to windows; exterior framework above, sheathed, papered and covered with clapboards, mitred at corners, and painted light green. Gables and roof effectively shingled and left to weather, saw-tooth work showing up well. Trimming color: Light yellow, with sash, etc., green. Heights: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; attic, 8 ft. The floor plans (slightly modified) show a good-sized reception hall, with angle corner, having leaded circular window of neat design in blue and amber glass; staircase having ornamental newel and turned balusters on closed string, in oak; other finish throughout, cypress. Parlor connects by five panel sliding doors, and has fireplace tiled, with mirrored mantel above. Dining-room, similarly connected, has wide bay, and connects with kitchen, having usual fixtures, through butler's pantry. Second floor plan shows four chambers and a bathroom, with exposed plumbing and fixtures of best make. Attic has two rooms finished off. Cellar, cemented, contains laundry (although tubs are shown in kitchen), cold room, servant's water-closet and heater. Principal rooms have hardwood floors, and house is provided with all gas and electric light connections complete. Cost, $4,750. Harry J. Robinson, Esq., builder, No. 406 South First Avenue, Mount Vernon, N. Y.

Our view was engraved direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

DOUBLE HOUSE AT MARIETTA, OHIO.

We present on page 69 illustrations of a double house recently erected for Seymour J. Hathaway, at Marietta, Ohio. The two parts of the house are separated by a brick dead wall from cellar to sheathing of roof, where it is cemented up tight to guard against fire. The foundation is built of brick, with pressed brick in front. Also, the division wall, separating front piazza, is of pressed brick. The exterior famework is covered with beveled weather boarding, except in front, which is covered with drop siding and dimension shingles in front gable. It is painted Colonial yellow, trimmed with white. The roof is of slate, with galvanized iron valleys and spouting. Dimensions: Front, 40 ft.; side, 47 ft., including piazza; Height of ceilings: Cellar, 6 ft.; first story, 9 ft.; second, 8 ft. 6 in.; attic to roof rafters, 9 ft. 9 in. The interior is trimmed with oak and finished natural and varnished, except kitchen and kitchen chambers and bathrooms, which are finished in poplar and painted white. The walls are plastered three coats. The floors are laid in poplar, except kitchens, which are laid in ash. The fireplaces of parlors and dining-rooms are built of brick, with oak mantels and tiled hearths, with wood facings. The bathrooms are supplied with hot and cold water from water boilers in the kitchens immediately underneath, so that water pipes lie next to chimneys to guard against frost. Bathrooms are furnished in the usual manner. The front doors glazed with chipped glass; parlor windows, with small lights at top, glazed with soft tints of stained glass. There are natural and artificial gas pipes laid to each room, including bathrooms. The front doors are furnished with electric bells. The cellar is provided with a drain well four feet in diameter, going down twenty feet to the sand, to keep cellars dry in wet weather. The house is connected with the city sewer system, and provided with a waste sink on each back porch, connected with the sewer. The floor plans show the location of closets, etc. Wm. Foreman, of Marietta, Ohio, architect. The Marietta Planing Mill Co., contractors. Plumbing by G. A. Stanfield & Co., Marietta, Ohio. Cost, $1,950; plumbing, $213. Total, $2,163.

Our plates were prepared from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

RESIDENCE OF JOHN F. KEATOR, ESQ., WEST WALNUT LANE, GERMANTOWN, PHILADELPHIA.

This ornate residence, illustrated on page 70, is an excellent example of the many beautiful modern homes, interspersed among the old Colonial mansions, which go to make up this well-known suburb of Philadelphia. In style it is Spanish Renaissance, with tile roof of Spanish shape. Checkered brick wall and cement dash band under the heavy projecting eaves. The main house has a frontage of 35 ft., and a depth of 63 ft. 2 in. The roof construction is such as to provide a full height of story to third floor, with ample ventilation loft over same. The main hall, which is finished in quartered oak, runs entirely across the house, thus giving liberal light and ventilation, as well as a spacious effect for the hall fireplace and square stairway, and is provided with a ribbed or paneled ceiling, inclosing the stair well, which is open above to the roof. Hardwoods are used throughout, in natural finish, with parquetry flooring of unique design. The mantel and cabinetwork throughout correspond with the general style of architecture adopted, the mantel in main hall being built entirely of stone, carved and decorated. The heating is by indirect steam, supplied from a ten-section boiler in cellar, and the lighting is both by gas and electricity.

The stable and carriage house is arranged to accommodate four carriages, and two stalls and one box stall, with coachman's quarters above, and is of the same material and general style as the residence itself the stone used in the basework and first story of both buildings being local gray stone, rustic finished.

The amount of cost for both house and stable was close to $25,000 for the work complete, exclusive of the ground. Hazlehurst & Huckel, architects, 913 Girard Building, Philadelphia.

Our plate was prepared from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT LAKE WACCABUC, N. Y.

We give on page 71 of this number of the SCIENTIFIC AMERICAN an engraving from a photograph and the floor plans of a house recently erected at Waccabuc, N. Y., overlooking Lake Waccabuc, for Mrs. Sarah F. Mead. This house contains a reception hall, with a fireplace, a large reception room, parlor, dining-room, staircase hall and den. There is a lavatory adjoining the entrance from the porte-cochère. The porch extends around two sides of the house, and there is a large balcony on the second floor. Kitchen is complete, supplied with closets, dressers and every convenience. On the second floor there are nine bedrooms, bathroom, and separate toilet-room. There are four rooms finished in the attic. Laundry in the cellar. This house was built from the plans and under the supervision of Child & De Goll, architects, 62 New street, New York.

Our plates were made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

OIL stoves and gas stoves should never be kept burning in a sleeping room, for they are burned in the open air of rooms, and, having no connection with a chimney flue, they throw the poisonous carbonic oxide of combustion into the air of the apartment and make it unfit for respiration. Even an oil lamp is dangerous if left burning all night; but an oil stove is worse, because stoves generally feed more flame, consume more of the oxygen, and give off more poisonous gas.

REFORMED DUTCH CHURCH, WARWICK, N. Y.

The subject of illustration on page 74 is the Reformed Dutch Church, at Warwick, Orange County, N. Y. The design is most successfully treated in the quaint and beautiful Byzantine style, aided greatly by the materials used in its construction and its surroundings. The entire structure is built of moss-covered field stone, unscarred by the hand of man, cut work being of native limestone, of a bluish tint. Two towers, of pleasing proportion, with entrance porches setting out beyond their face, and a porte-cochère with pediment of pebble dash plaster, are all roofed and covered with overburnt Spanish tile, brown in color. The main roof is covered with shingles, and stained dark red: trimming color, dark green. Dimensions: Front, exclusive of porte-cochère, 54 ft.; side, 138 ft. The plan shows a most convenient and well thought out arrangement. Large triple vestibules open into one another, and have wide arched openings to the auditorium, where, at the farthest end, the choir space and organ are recessed behind the pulpit on a wide platform. The pastor has a separate entrance to his study, and a private passage to the platform. There are two small and one larger class-room (with entrance to library), having a seating capacity of 150; lavatory is provided at rear entrance; kitchen and ladies' parlor upstairs. The auditorium has seating accommodations for 700 persons (pews being used); is wainscoted with red oak, the finish throughout; walls and ceiling of sand finish plaster, decorated; stained glass in windows, and tiling in vestibule. Cellar, cemented, contains two hot air furnaces and fuel storage. Cost, $30,000. E. G. W. Dietrich, Esq., architect, 18 Broadway, New York. C. Conrad Schroeder, Esq., builder, Scranton, Pa.

Our engravings were made direct from photographs of the building, specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT MOUNT VERNON, N. Y.

The house shown on page 75 was built for E. W. Fiske, on Sixth Avenue, near Fourth Street, Mount Vernon, N. Y., at a cost of $2,500, and A. Murray Jenks, of Mount Vernon, N. Y., was the architect. The house has a bluestone foundation and a brick underpinning, cement floor in the cellar, and the ceiling of the cellar is plastered and the walls throughout are white, hard-finished walls, with plaster cornices and plaster centrepieces on the first floor, and one room finished in the attic. The frame is of spruce, and the outside is sheathed and papered, and the paper is covered with clapboards, with a belt of shingle between the first and second story windows, and the gables are shingled, and the roof is covered with the best quality white pine shingles, and the work is first class all through. The inside is finished in whitewood, except the kitchen and bathroom. The kitchen is finished in North Carolina pine, and the bathroom is finished in ash; kitchen and bathroom are wainscoted; has sink in the kitchen, and the laundry in the cellar; and all inside woodwork is finished in the natural wood, with a dead finish, and all outside woodwork has three coats of paint; and is heated with hot air, and the house has ample closet room. The house is 22 x 42 ft., and the first story is 9 ft., and the second story is 8 ft. 6 in.

Our plate was prepared from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

LOW COST HOUSES, HASBROUCK HEIGHTS, N. J.

Our engravings on pages 72 and 73 represent the perspective views and floor plans of two low-priced dwellings, built for the Hasbrouck Heights Land and Improvement Company, of Hasbrouck Heights, New Jersey, from plans and specifications by S. A. Dennis, architect, Arlington, N. J. The floor plans are similar for both houses, but the elevations differ. The elevations show attractive and pleasing exteriors. The exterior walls are sheathed, papered and sided with beveled siding of white pine. Gables are shingled as shown, and trimmed with white pine strips and mouldings. Roofs are all covered with cedar shingles, without paint. The floor plans show a very cozy and tasty arrangement of rooms, with good closet space in the kitchen and dining-room. The kitchen is furnished with a brick set range and boiler complete, also sink, wash trays, and stairs to the cellar, and door out on the side piazza. The entire house is finished throughout with clear white pine, and finished in the natural wood. Each room has an entrance from the halls to the same. Main stairs are built of ash, with turned balusters and newels of special designs. The house is furnished throughout, as shown on the plans, with complete sanitary plumbing. The floors are all laid with clear, narrow North Carolina pine flooring-boards, with the kitchen floor laid perfectly clear. There is one room finished in the attic, to which there is an inclosed and boxed stairway, with round ash rail, secured to the walls by iron brackets. There is a good cellar under the whole house, with walls of brick laid up in red mortar. The bottom has a concrete floor four inches thick, and same contains a portable hot-air furnace to heat the whole house complete. The dimensions are: Front, 24 ft.; side, 32 ft. Heights of the ceilings are: First floor, 9 ft.; second floor, 8 ft. 6 in.; cellar, 6 ft. 8 in., and the attic 8 ft. in the clear. This house cost, to build as above stated, at Hasbrouck Heights, New Jersey, by contract, $1,850.

Our plates were made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

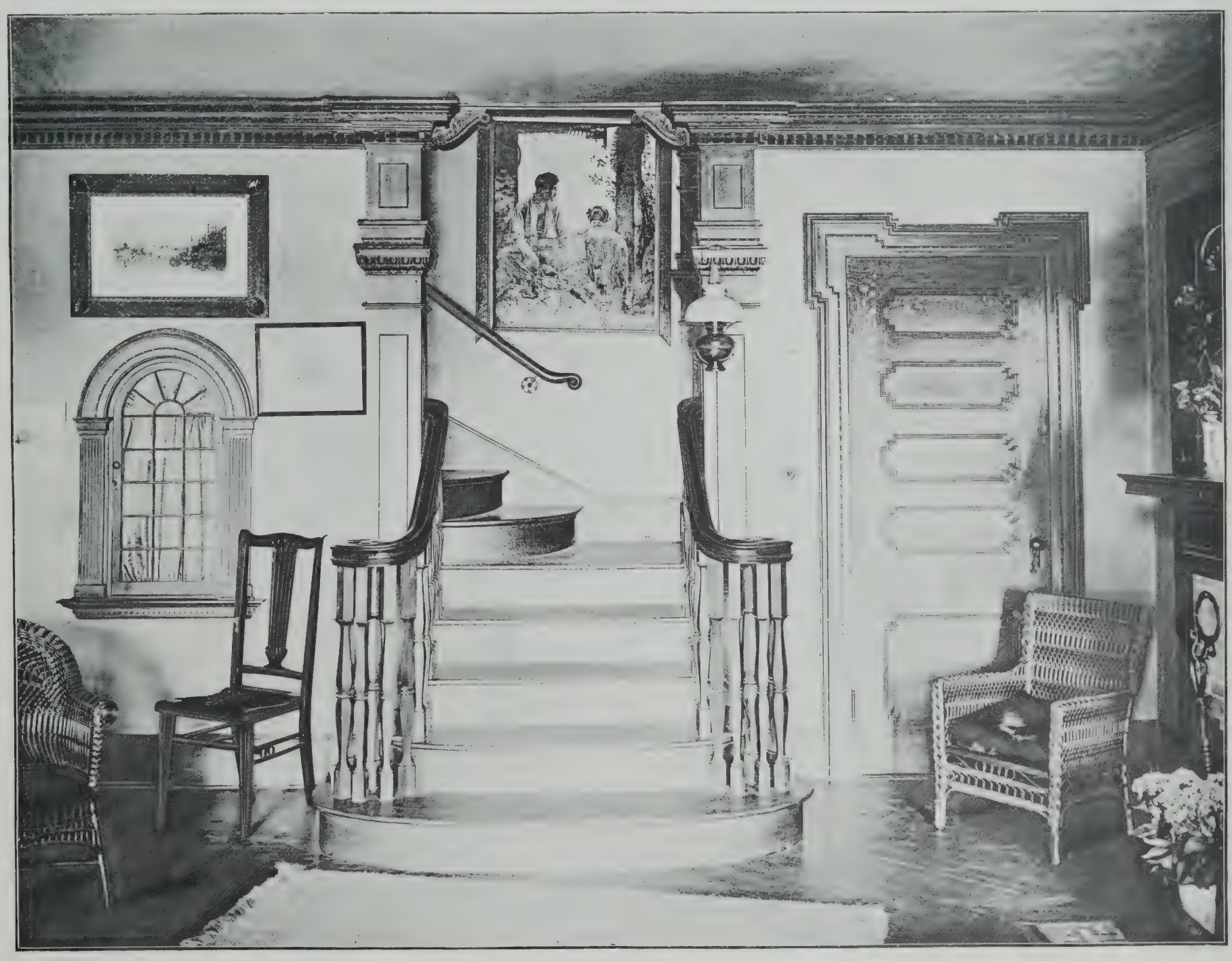
WINDMILLS AT MOUNT VERNON AND WAKEFIELD, N. Y.

On page 78 we show views and floor plans of two windmills. The square one is treated in the battlemented style, having stone foundations, structure above being shingled with cypress shingles, left to weather; trimmings painted dark green; sash glazed with amber glass and divided with wooden muntons. The mill is a 16 ft. diameter galvanized steel Aermotor, and was erected by that company for the Primrose and Villa Parks Water Company, at Mount Vernon, N. Y. Well is 160 ft. deep, supplying 50 gallons of water per minute; tank capacity, 20,000 gallons. Cost complete, $1,800. Frank Marion Wright, Esq., architect, Fairfax Building, Mount Vernon, N. Y.

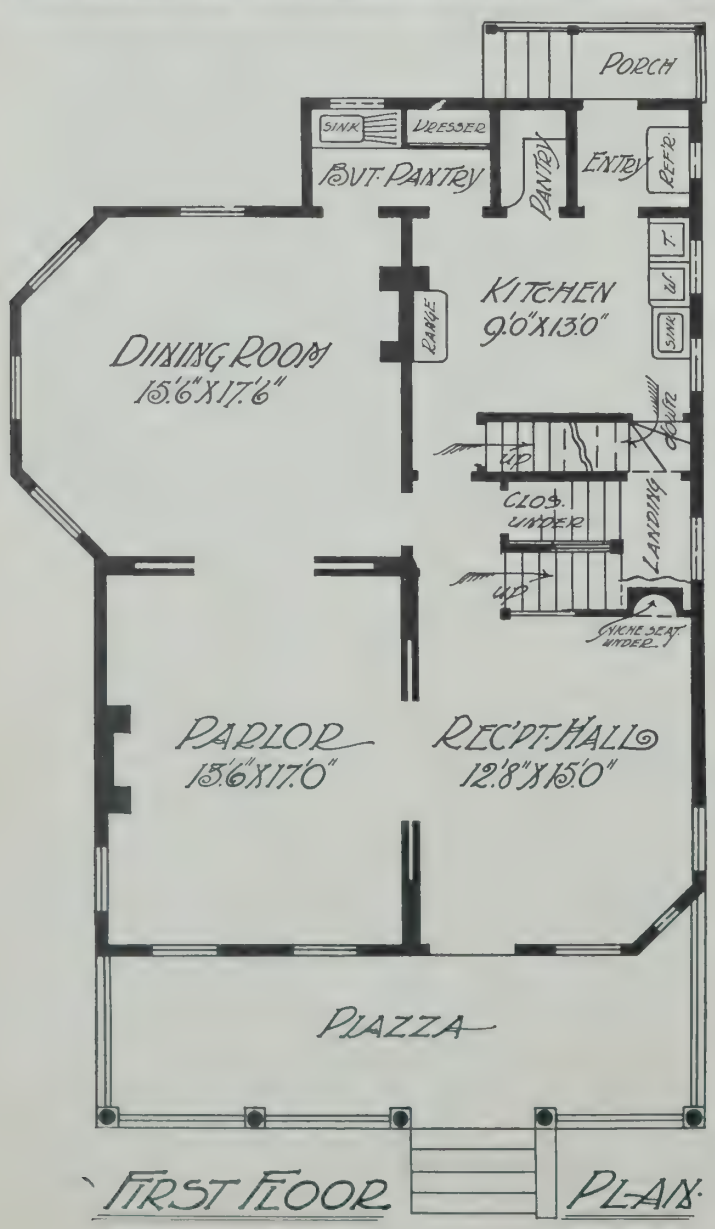
The octagonal tower is treated in the Colonial style, having rubble stone foundation on rocky ledge, with red brick quoins and jambs; structure above shingled and left to weather; trimming color, white; two oval ventilators near top. This mill supplies water to the property of J. P. Cranford, Esq., at Wakefield, N. Y. Motor and pump were built by the same company as the other (The Aermotor Company), and cost $175. The water is taken from an artesian well, 250 ft. deep, about 20 ft. from centre of tower, making it necessary to use a set of triangles in order to pump same. About 180 ft. of two-inch pipe was used, and at times elevates the water the entire distance, 30 ft. above the surface of the ground to the top of tank, which is 12 ft. in diameter and 12 ft. high, having a capacity of about 10 000 gallons.

The Aermotor is a galvanized steel wheel, 12 ft. in diameter and will pump up an elevation of 50 ft., in a fifteen-mile wind, 800 gallons per hour developing about two-horse power. Ralph N. Cranford, Esq., architect, Wakefield, N. Y.

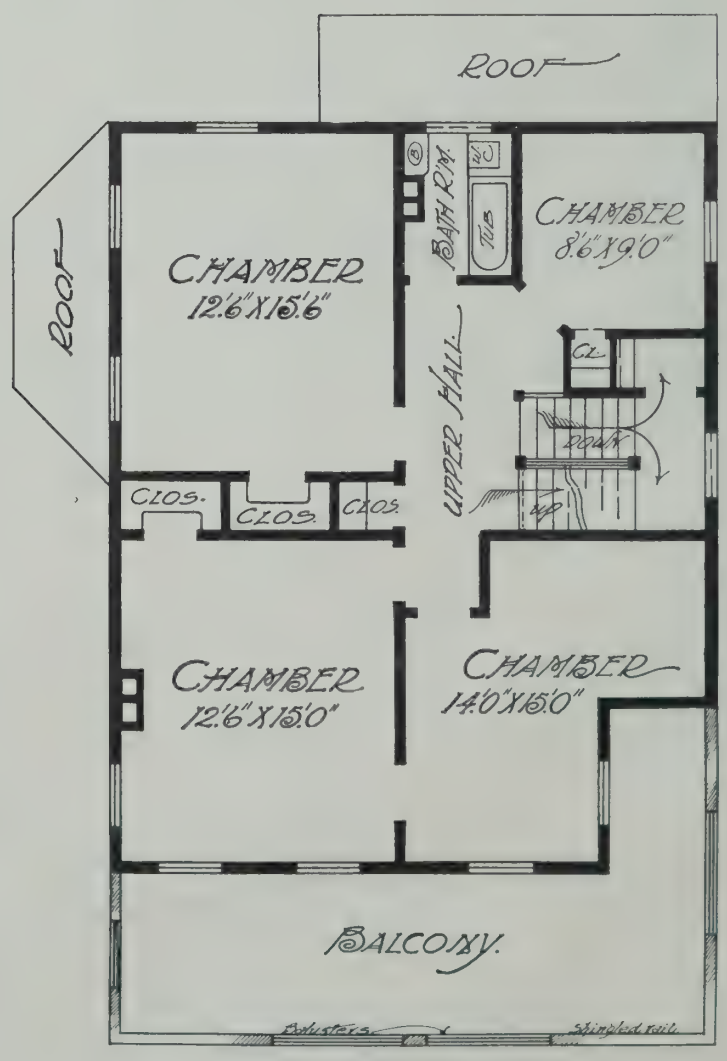
Our engravings were made direct from photographs of the buildings, specially taken for the SCIENTIFIC AMERICAN.



A RESIDENCE AT WAKEFIELD, N. Y.—See page 66.



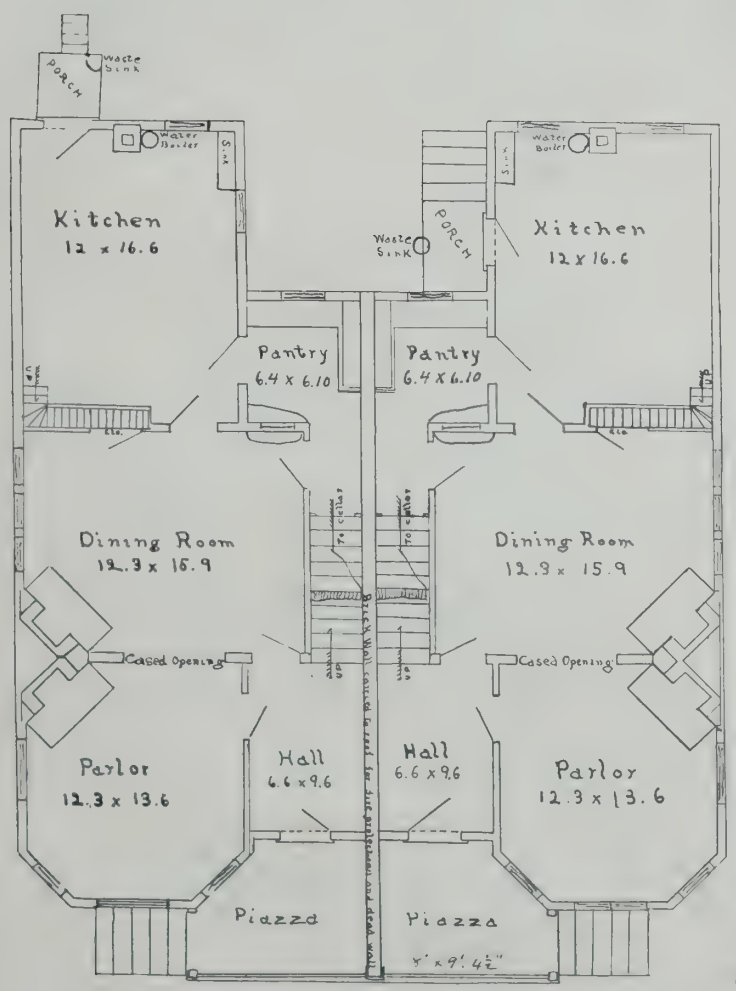
FIRST FLOOR PLAN.



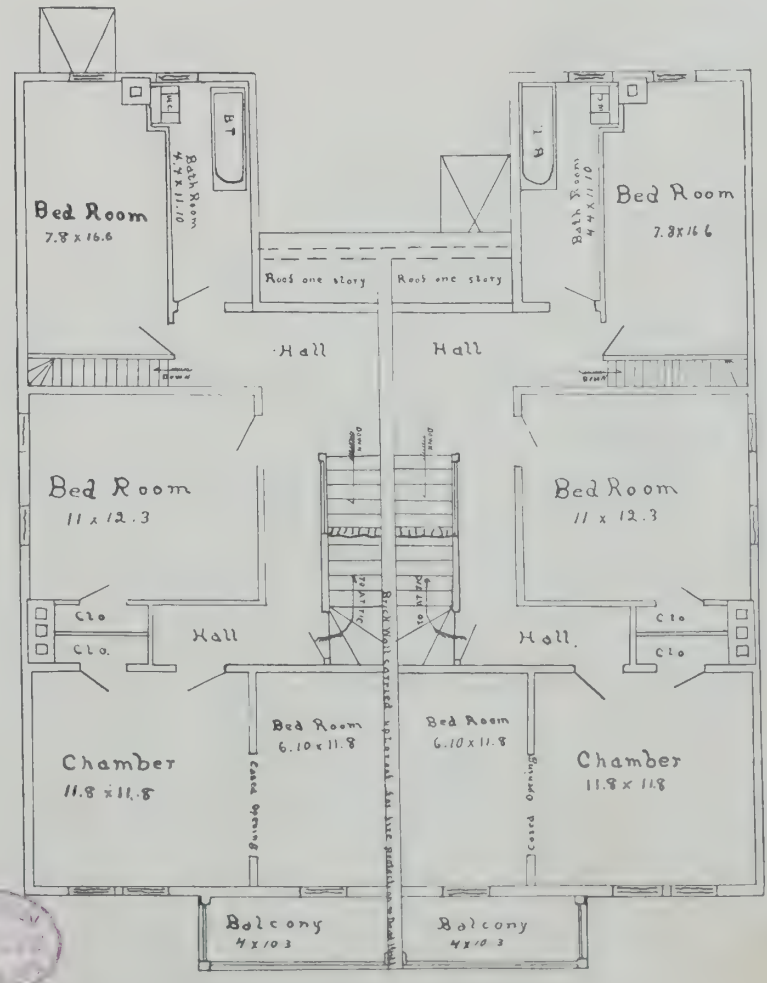
SECOND FLOOR PLAN.

BOSTON PUBLIC LIBRARY

A COTTAGE AT MOUNT VERNON, N. Y.—See page 66.

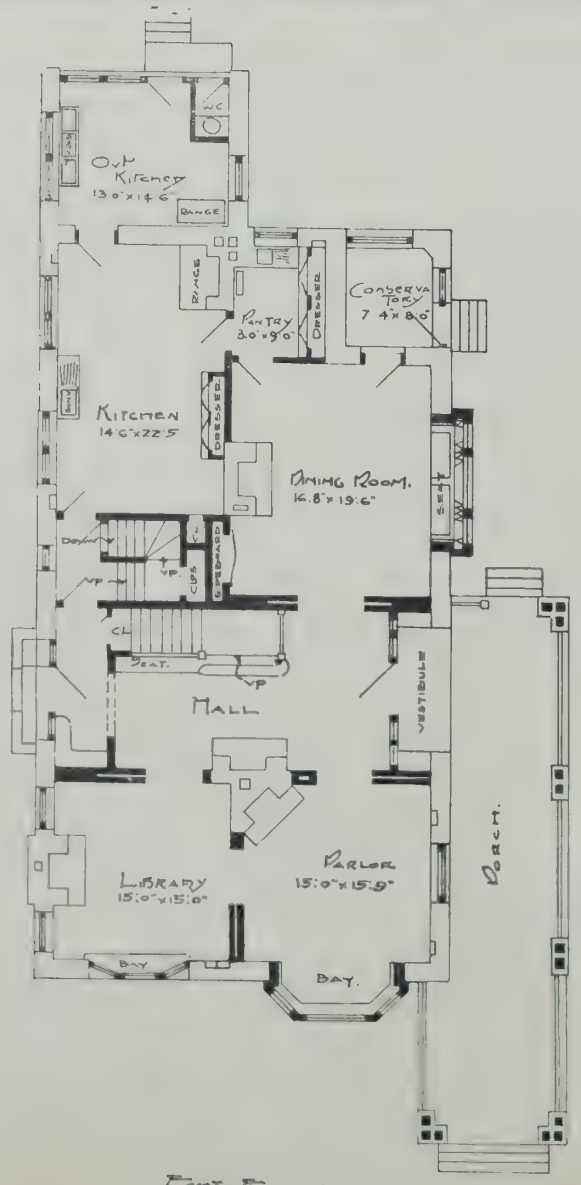


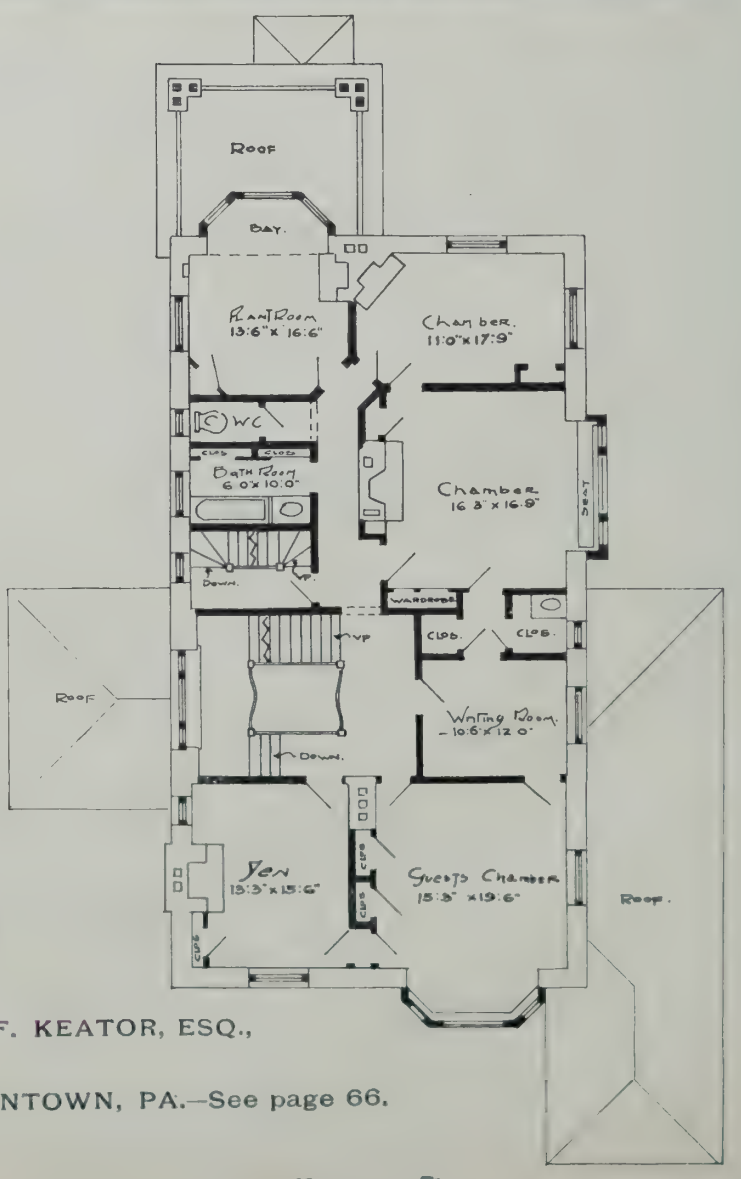
1st Floor Plan



2nd Story Plan

DOUBLE HOUSE AT MARIETTA, OHIO.—See page 66.





Forte · Cochere.

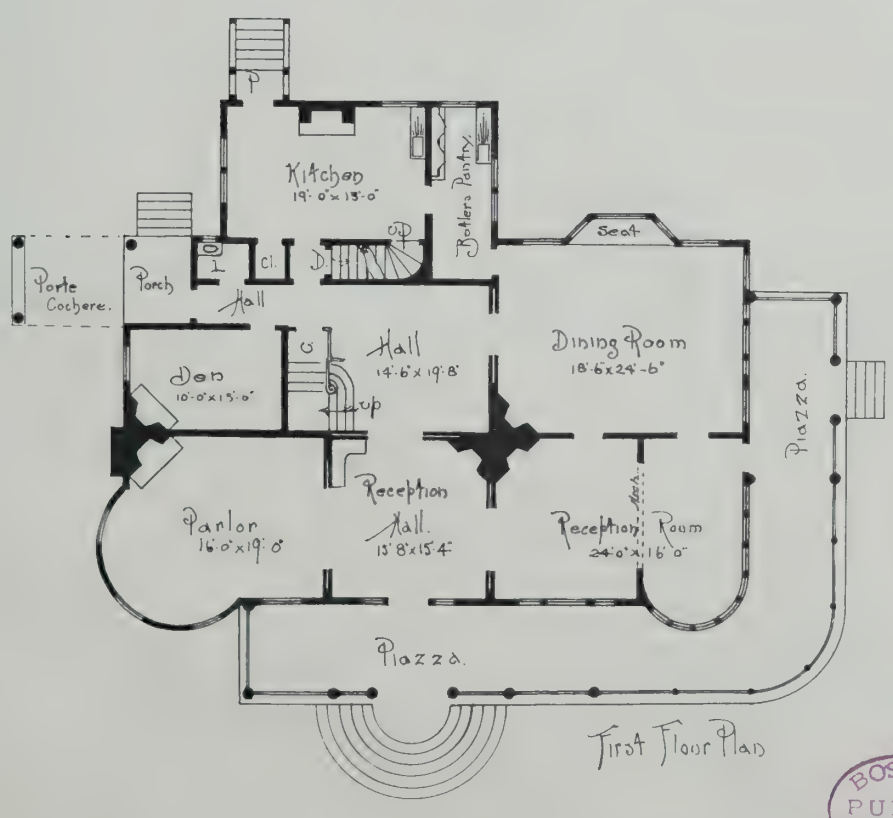
First Floor

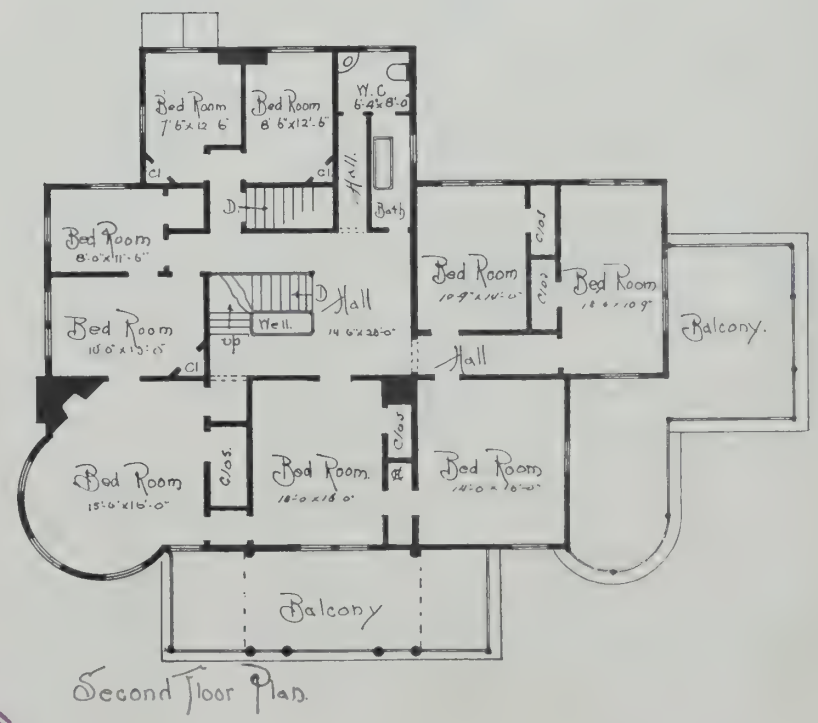
Second Floor

BOSTON PUBLIC LIBRARY

RESIDENCE OF JOHN F. KEATOR, ESQ.,

GERMANTOWN, PA.—See page 66.





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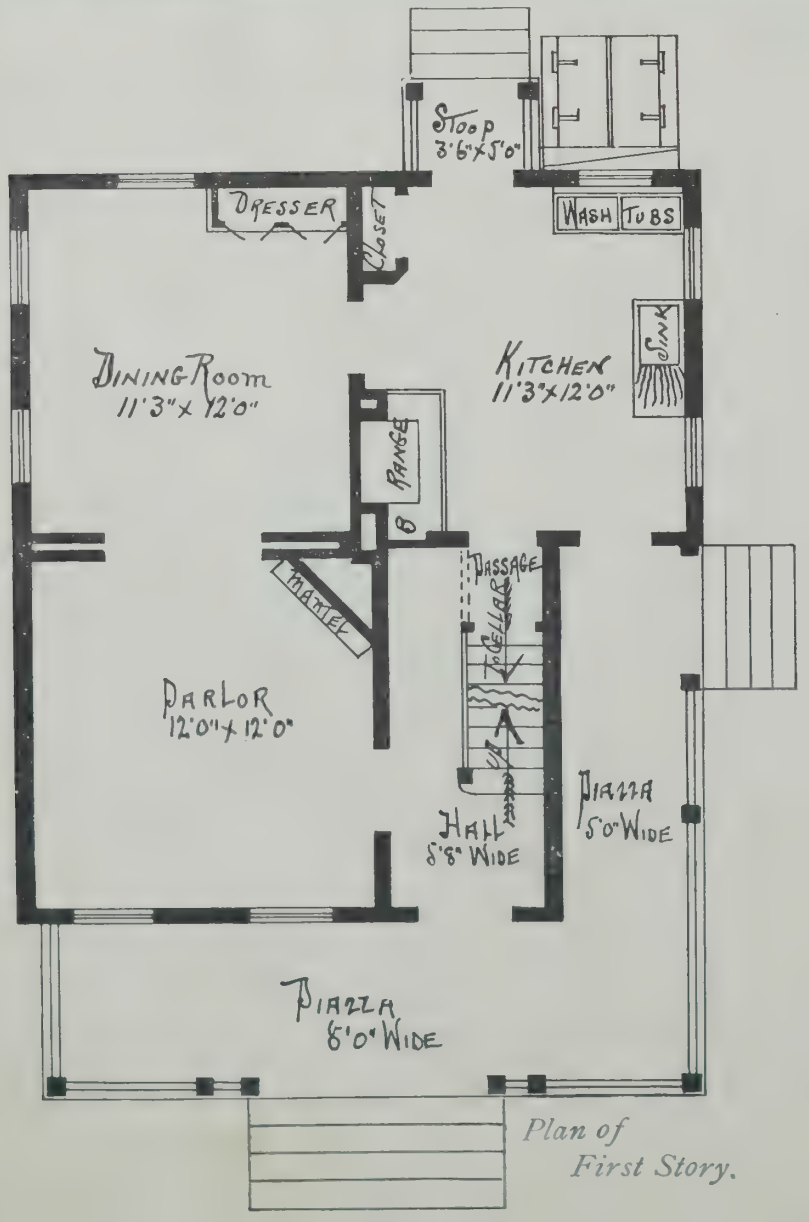
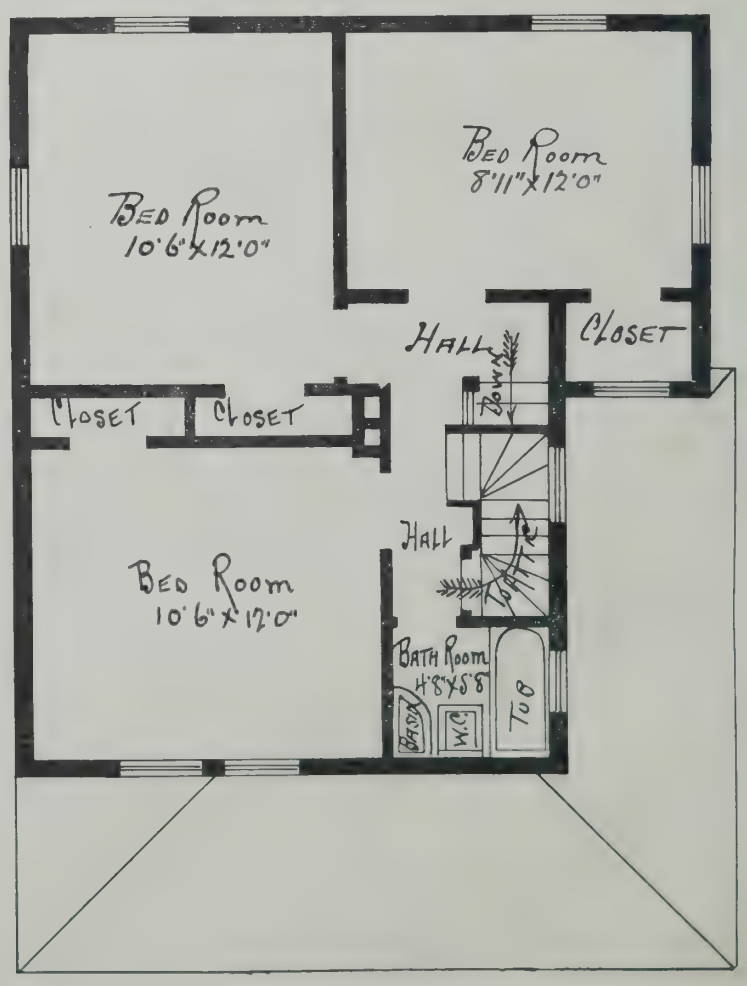
A RESIDENCE AT LAKE WACCABUC, N. Y.—See page 66.



Plan of First Story.



Plan of Second Story.

LOW COST HOUSE, HASBROUCK HEIGHTS, N. J.—See page 67.

LOW COST HOUSE, HASBROUCK HEIGHTS, N. J.—See page 67.

A STABLE AT WAKEFIELD, N. Y.

On page 77 we illustrate a stable of original design and treatment, the property of J. P. Cranford, Esq., at Wakefield, N. Y. Dimensions: Front, 52 ft. 6 in.; side, 50 ft., exclusive of octagonal tower, each side of which measures 3 ft. 9 in. Underpinning of stone, covered with pebble dash plaster, gray in color, with red brick jambs, heads and quoins. Water table of cut stone. The great overhang of roof at front is supported by brackets of yellow pine, natural. Gables, roof and sides effectively shingled, and left to weather. Trimming color, white. Sash divided by wooden muntons. Octagonal corner tower forms dovecote above. The plan shows large carriage space, with wide opening to stable, having six stalls, one being box, and another for cow; harness room at left; rope storage at right. Sink at angle. Finish and ceiling, Georgia pine; floor cemented. Tool room separate, and has outside entrance. Staircase in tower to floor above, having two rooms and feed storage. Dovecote is separate, in upper part of tower. Ralph N. Cranford, Esq., architect, Wakefield, N. Y.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

Hints to Readers.

We are not in doubt as to the utility of the BUILDING EDITION of the SCIENTIFIC AMERICAN. The affirmative evidence is overwhelming. Go where you will throughout the length and breadth of this great country, and on every hand will be found new and tasteful buildings, the counterparts of which were given in the SCIENTIFIC AMERICAN, from which they were planned and erected.

No publication has ever been issued in the architectural line from which so many dwellings and homes have been chosen and built. The reason is simple. In every number we place before the reader a variety of new plans and designs of the most practical nature. Not fancy sketches, of which there can be doubt as to realizing the details when the work of building is begun; but actual plans and perspectives of the latest designs of houses already erected. In almost every instance the plans we publish are produced from the buildings themselves, the perspectives being from photographs specially taken by our own artists. Therefore, when a plan is chosen from the SCIENTIFIC AMERICAN, the builder knows that it is practical. The exact details, form, proportion, dimensions, arrangement of everything, stand before the eyes, ready for the closest measurement and the most careful study.

Every family having in contemplation the building of a home should, as a matter of economy, possess this most valuable work, for in its pages, at the low cost of $2.50 a year, they have before them the best perspective examples of existing dwelling houses, and the most fresh and approved interior plans therefor. This will be a great aid in selecting and deciding upon the character of the intended home, besides saving them time and money.

As to the value of this periodical to builders and architects, it is needless to dwell. It speaks for itself. What signifies to them the trifling sum of $2.50 a year for a helper in the plan and perspective line, that is so sure to aid them in closing valuable contracts amounting to hundreds and thousands of dollars?

The Education of Customers.

This country is well supplied with architectural papers, many of them ably conducted, of superior value as instructors of architects, exhibiting the theory, mathematics, principles, practice, rise and progress of architecture from the earliest ages. The aggregate circulation of these works is quite limited, being confined chiefly to purely professional architects, a comparatively small class, comprising throughout the entire country probably not over three thousand. The SCIENTIFIC AMERICAN occupies quite a different field. It aims principally to educate the customers of architects and builders. This it accomplishes by placing before them a constant succession of fresh and splendid illustrations of attractive buildings and plans. The beneficial influence of this method is very great, very practical, and is sensibly felt by architects and builders in all parts of the country. Their services are in greater demand, because their customers, no longer satisfied with cheap and ordinary buildings, now ask for the latest, the newest, and the best designs, such as the SCIENTIFIC AMERICAN brings to them.

Our paper goes to the masses of the people, who love to look at and study the representations of good buildings.

Where the SCIENTIFIC AMERICAN freely circulates, there architects and builders thrive, there property is intelligently improved; and everybody knows that property, if attractively improved, is increased in value.

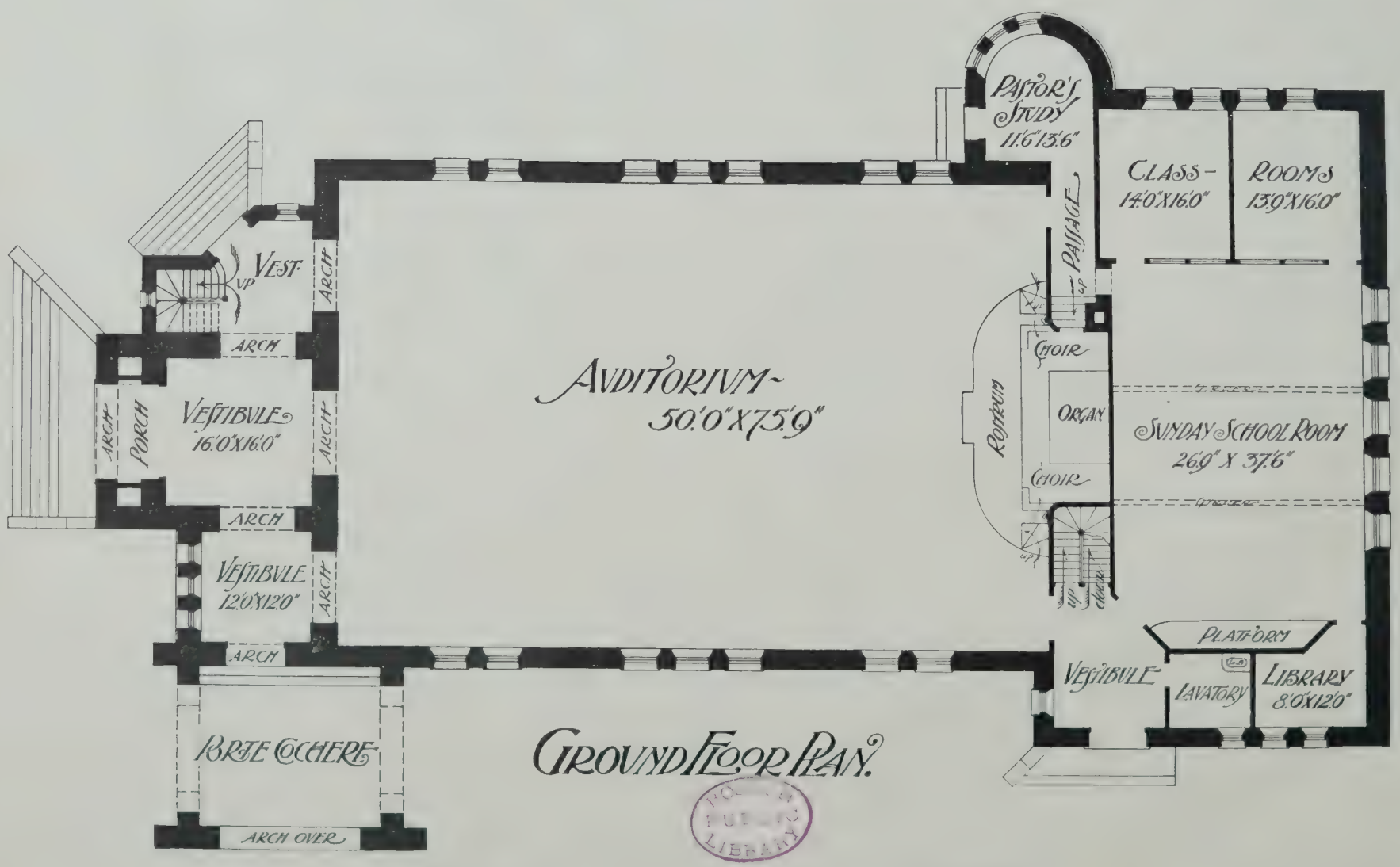
The SCIENTIFIC AMERICAN has by far the largest circulation of any architectural paper in the world, because it not only goes to architects and builders, but also to *their customers*, who vastly exceed the former in number.

This, also, is the reason why the SCIENTIFIC AMERICAN has the largest advertising patronage of all the architectural papers. It is *these customers* who order and pay for the plans, and the buildings, and the plumbing, the painting, the hardware, the walling, the papering, the heating, the lighting, the decorating, the finishing, the furnishing, and every other thing that is used or placed within or without the building. "We get good returns for money spent in the SCIENTIFIC AMERICAN," say advertisers, and that settles the question.

When our Building Edition first appeared, nearly all the architects were down upon it. They say we gave away their plans free to the public, and the effect would be to take bread from their mouths. But they now find, by actual experience, they were mistaken. The SCIENTIFIC AMERICAN promotes their business by educating their customers, and creating a demand for their higher and more profitable class of plans and designs.

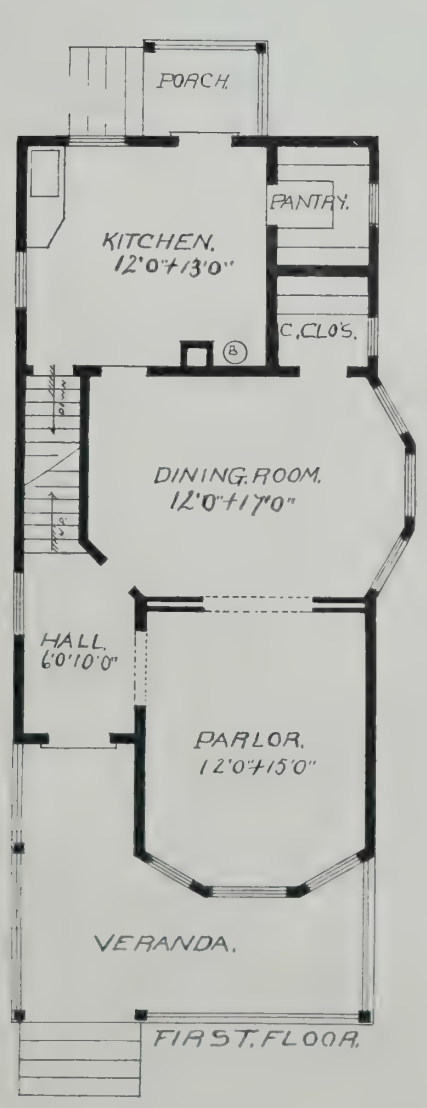
THE largest bell in Japan, that in the temple at Kioto, is twenty-four feet high and sixteen feet in diameter across the rim.

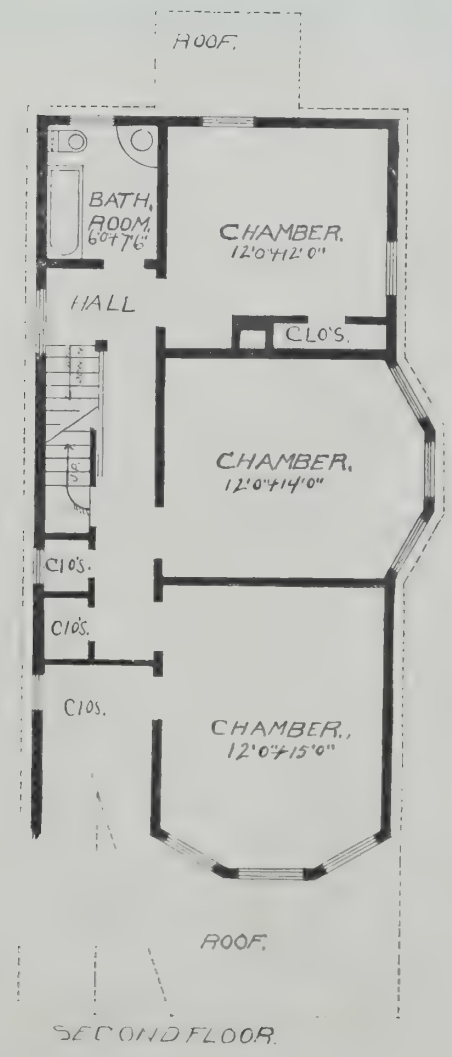
THE highest chimney in the world is at Glasgow. Height, 474 feet.



PUBLIC LIBRARY

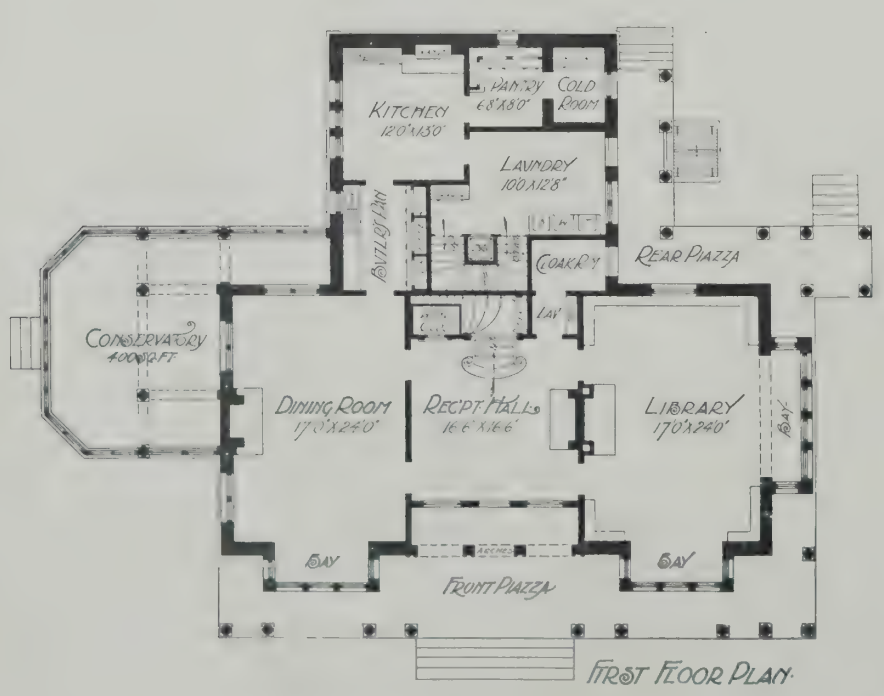
REFORMED DUTCH CHURCH, WARWICK, N. Y.—See page 67.



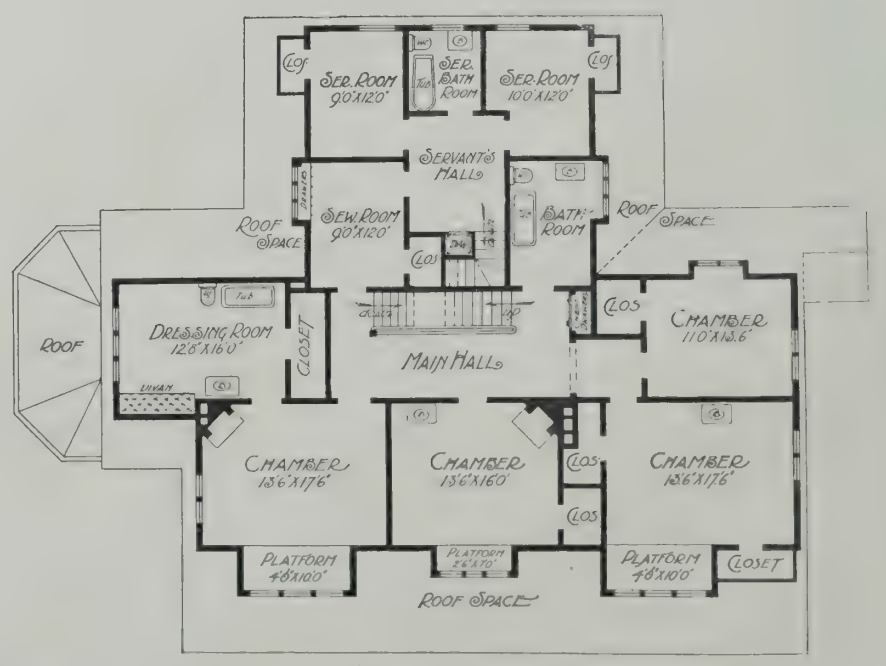


BOSTON PUBLIC LIBRARY

A COTTAGE AT MOUNT VERNON, N. Y.—See page 67.



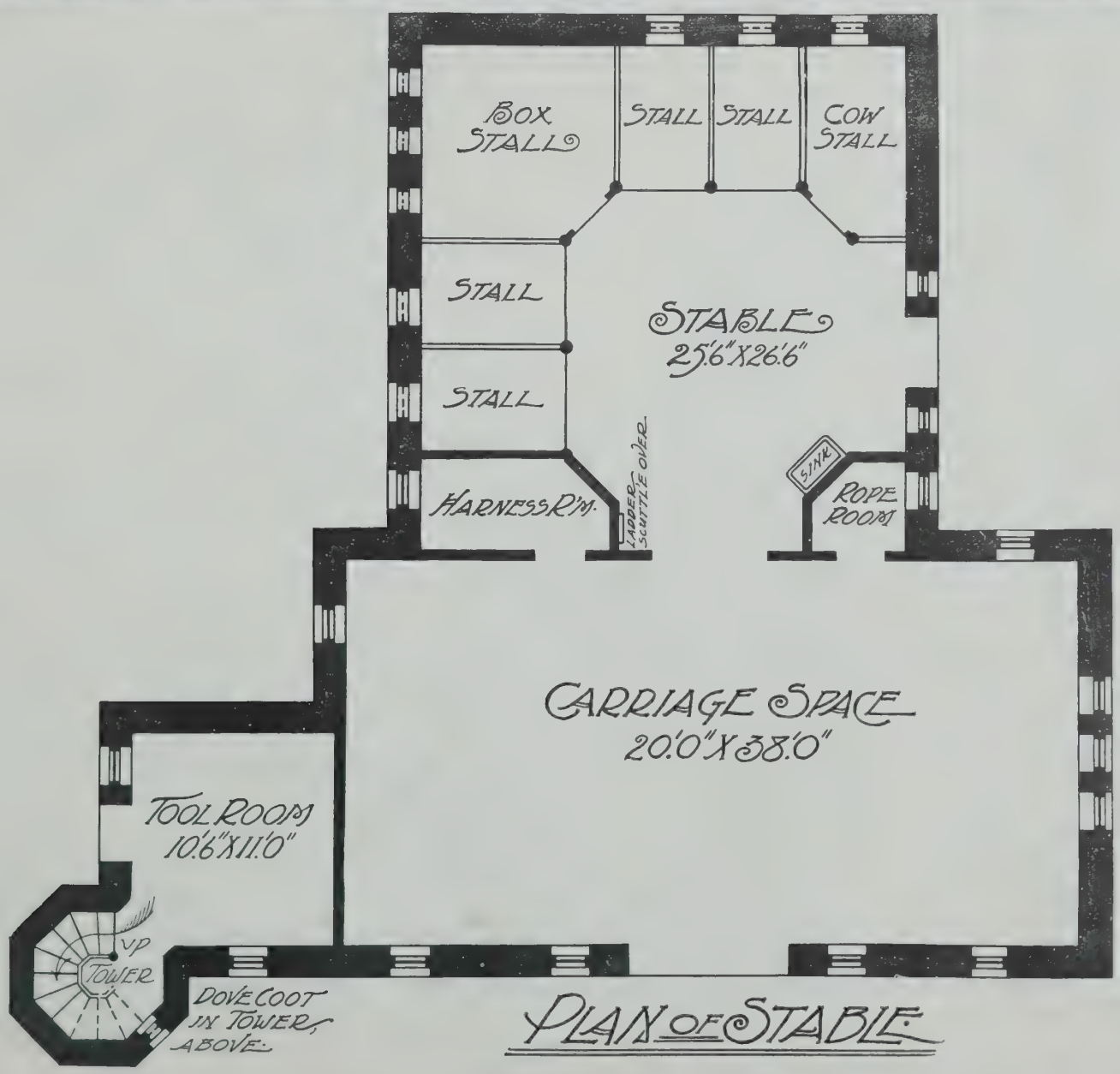
FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

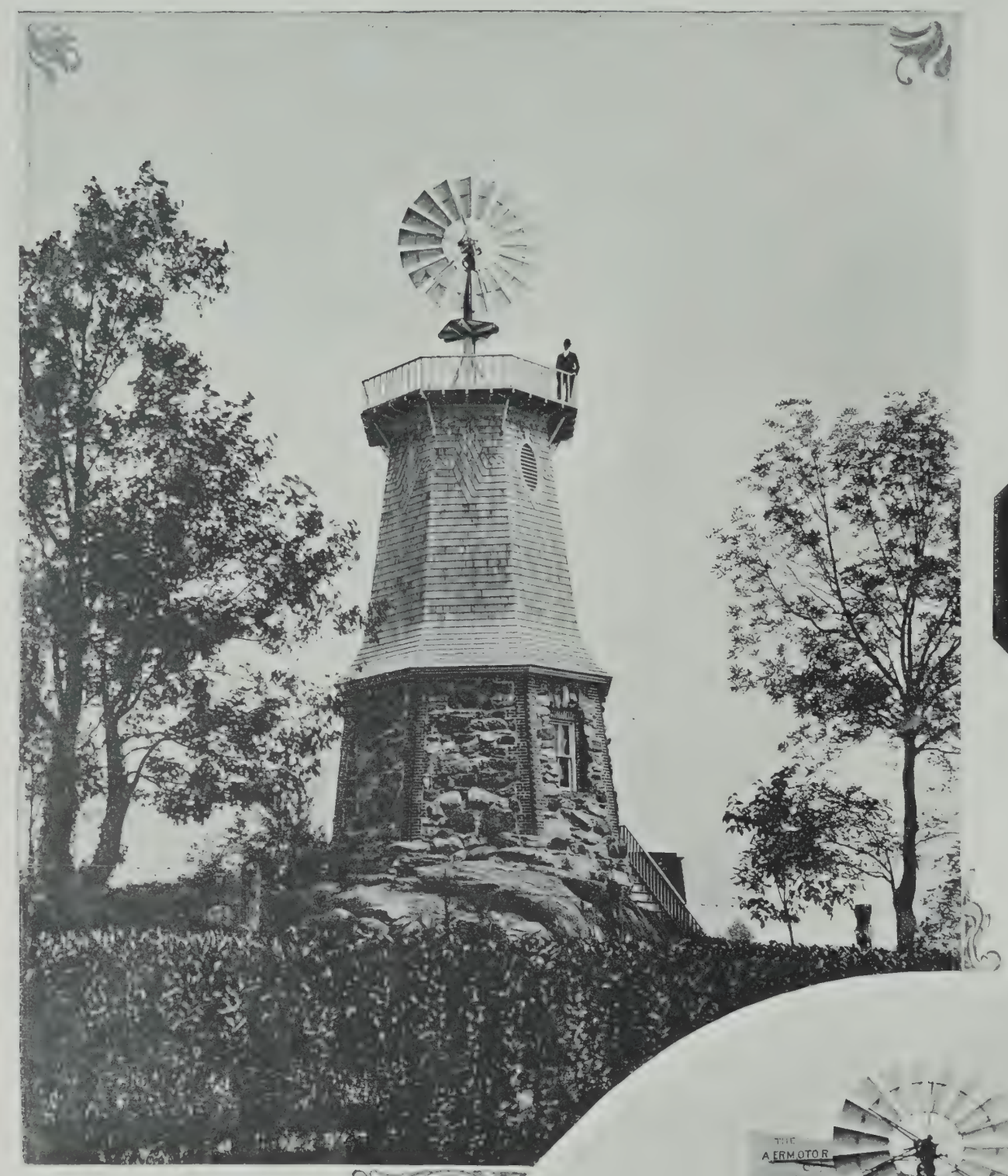
BOSTON PUBLIC LIBRARY

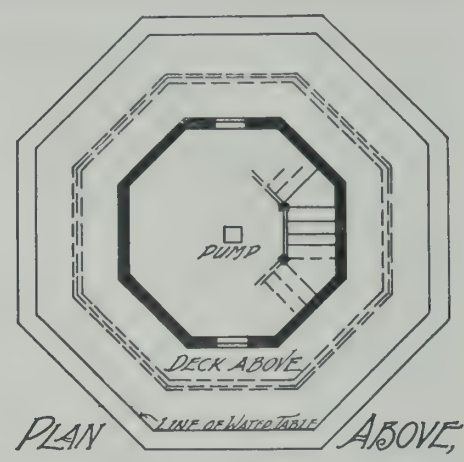
A RESIDENCE AT WAKEFIELD, N. Y.—See page 66.



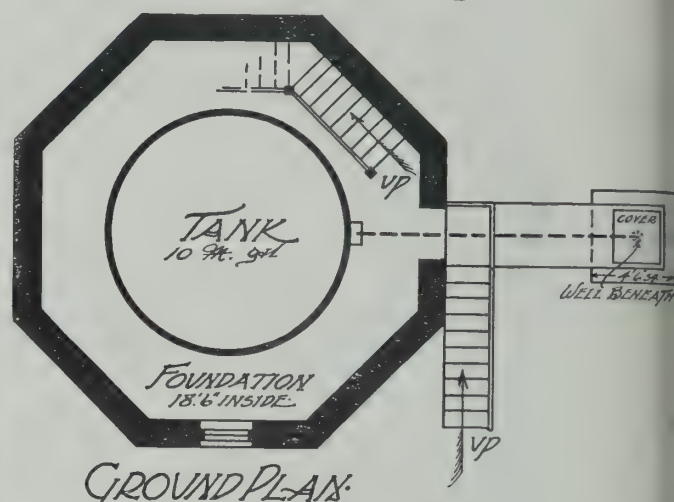
PLAN OF STABLE.

A STABLE AT WAKEFIELD, N. Y.—See page 73.

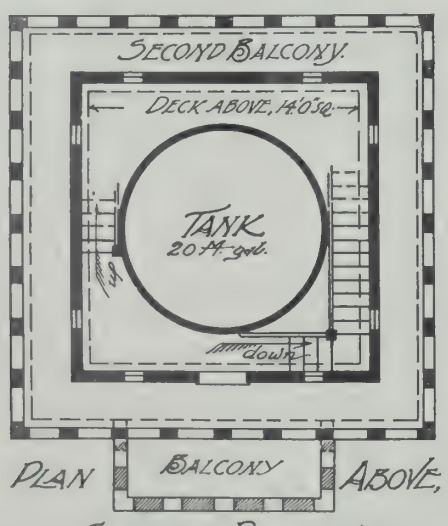




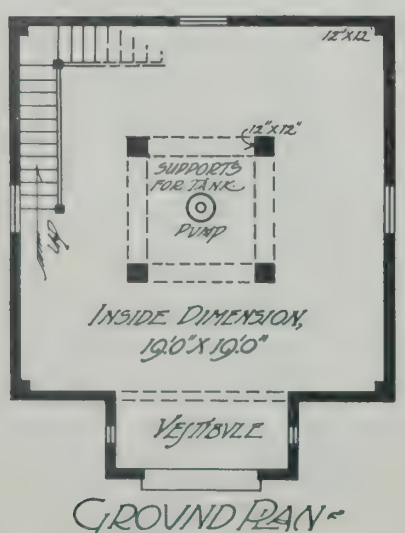
PLAN ABOVE, SHOWING PROJECTIONS.



GROUND PLAN.



PLAN ABOVE, SHOWING PROJECTIONS.



GROUND PLAN.

WINDMILLS AT MOUNT VERNON AND WAKEFIELD, N. Y.—See page 67.

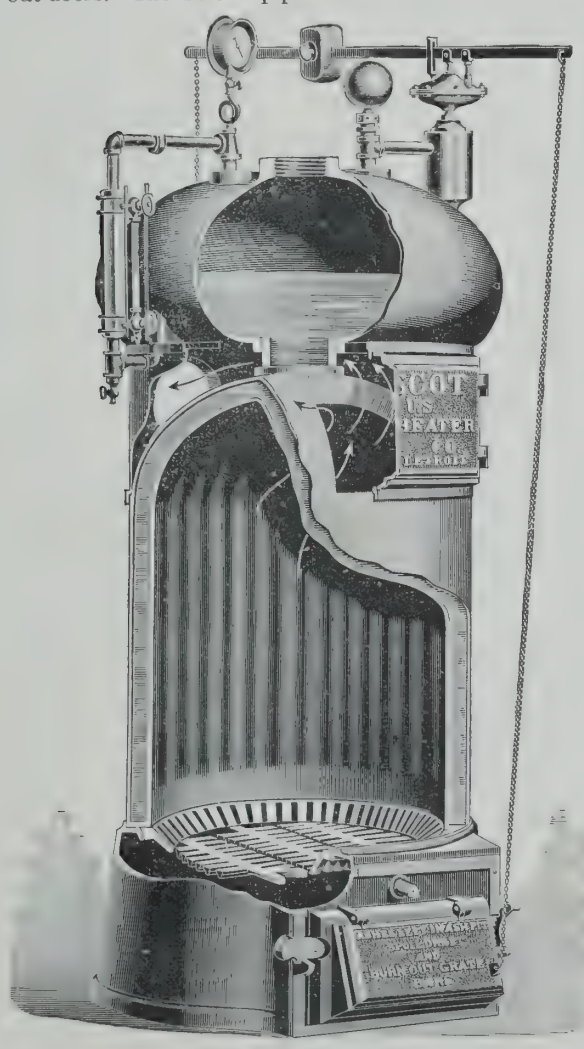
PUBLIC LIBRARY

The Echo Organ at Westminster Abbey.

This organ, presented by Mr. A. D. Clarke, has now been fixed in the triforium above Tennyson's monument, and is almost completed. The new instrument is electrically connected with the main organ, and the same engine supplies wind to both. The electric wires by which the connection is made are carried from the organ to the echo instrument incased in a small leaden pipe, while a larger pipe, taken up through the roof, gives the connection between the bellows and the echo pipes. A new keyboard has been added to the already complicated main organ (making five manuals in all), and there are electrical contrivances in great variety, by means of which couplings and stops are put into or out of action. Despite the distance separating the two instruments, the effect of touching the keys on the new manual is instantaneous, and the echo organ is as sensitive in responding as is the main instrument.

THE MASCOT HEATER.

This heater, manufactured by the United States Heater Company, of 201 Campbell Avenue, Detroit, Michigan, is one of the most efficient of the new small heaters on the market. It is made either for hot water or steam, and is especially adapted for small heating plants, such as are required in dwelling houses, flats, greenhouses, etc. It is made in three sizes, which are rated to carry respectively 275, 375 and 475 feet of steam radiation, or 175, 250 and 350 feet of hot water radiation. We show herewith a cut of the Mascot for steam. The body is a single thimble-shaped casting, the top and sides of which are hollow, forming an unbroken waterway. This casting stands upon an ash pit, and is connected at the top with a round steam dome. The only openings in the body of the heater are the one opposite the fire door, one for the return pipe at the back of the heater, and the four inch opening at the top where it is connected with the upper section or dome. Below the dome is a smoke space, inclosed by iron plates. In the front plate is the fire door, and at the sides are clean-out doors. The smoke pipe collar is at the back. The

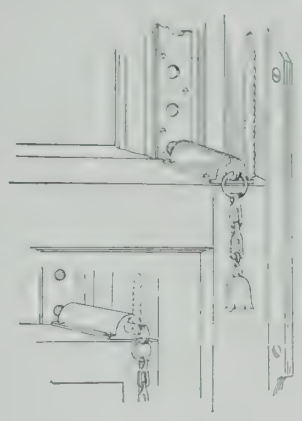


THE MASCOT HEATER.

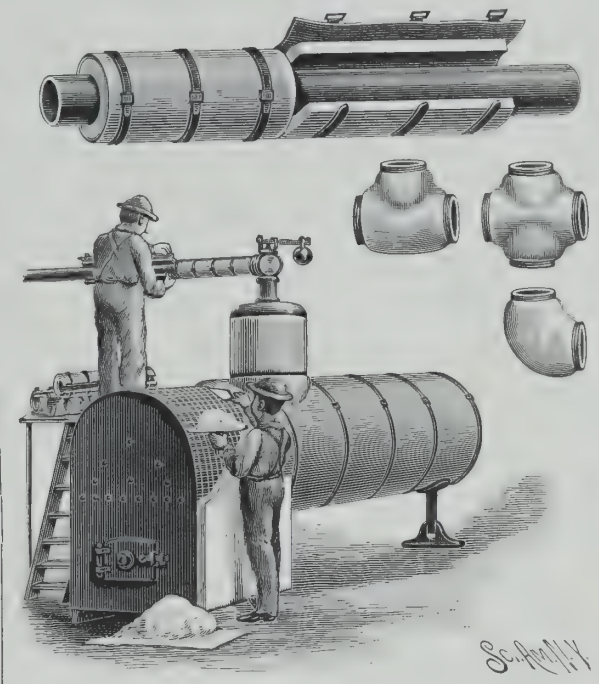
corrugated walls of the fire-pot present a great extent of surface to the direct action of the radiant heat, while the draught after striking the crown is deflected through the opening, and passes up against and under the top dome, and out through the smoke pipe. The heater is as simple as possible in every respect. It is easily handled, easily set up, and easily cleaned. In setting it up there is only one joint to be made, and that is the right hand nipple connecting the heater proper with the top dome. The heater is shipped in parts, and can easily be carried into any cellar. The grate has the perfect arrangement for shaking and dumping which has proved so successful and satisfactory in the Capitol and Hecla. The area of the grate is changed in each size, making the proportion of grate to fire surface uniform. Clinker doors provide means for keeping the grate properly cleaned without trouble. This construction gives a very high degree of efficiency, and the Mascot is gotten up in handsome style. The Mascot for hot water is the same as the steam heater, except that, in place of the deep steam dome at the top, a shallow water section is used. The circulation of the water is uniformly vertical, with no lateral water-courses and no flat sections.

CARLISLE'S BURGLAR-PROOF WINDOW-SASH LOCK.

The simple and inexpensive window lock shown herewith has been brought out by E. A. Carlisle, Pope & Co., of No. 2 Sudbury Street, Boston. It is a safe lock when the window is closed, or the lower sash may be raised or the upper one lowered six inches, and the window still be secure from tramps and others who are watching for open windows. The lock is secured on the meeting rail of the lower sash, directly over the stile, and a plate with holes is screwed on the lower end of the stile of the upper sash, the plate being so placed that the bolt will readily enter the lower hole when the window is closed. Holes are then bored in the stile through the holes in the plate. When the window is closed, the device is self-locking.



STEAM PIPE AND BOILER COVERING.



STEAM PIPE AND BOILER COVERING.

The saving of coal effected by having steam boilers and pipes thoroughly covered is well understood by nearly all steam users, and the absolute necessity for such covering of pipes where live steam is to be conveyed any considerable distance is everywhere conceded. In the accompanying illustrations are shown the methods by which non-conductive covering is applied for purposes of insulation by the New York Fireproof Covering Company, of 121 Liberty Street, New York. The material used as a non-conductor is rock wool, which is made of feldspar and limestone, in much the same way as mineral wool, and is claimed to be superior to the latter, inasmuch as it contains no sulphur, presenting more minutely divided air spaces, whereby the covering is made very light, containing about 96 per cent. dead air. The pipe covering is made in sections three feet long, to fit any size pipe, with heavy canvas casing, and laps and metal bands and fittings to match. For boilers, domes, heaters, tanks, etc., the coverings are made in blocks from one to two inches thick, these to be covered with wire netting and a coating of rock wool cement, making a smooth, hard finish, the blocks being cut to fit around projecting pipes or other irregularities. A rock wool fireproof cement, which can be mixed with a trowel and applied like mortar, is provided for covering irregular shaped surfaces. The covering is in each case very simple of application, requiring no skilled labor; and, as the saving from radiation is very great, the investment would pay for itself in a few months' time.

A Large Shipment of Roofing Slate.

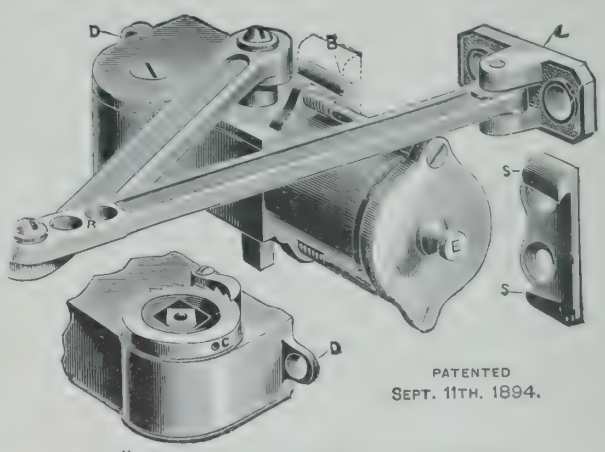
A solid train of thirty-seven cars, carrying over a million pounds of roofing slate, was sent out, in August, by the Slatington-Bangor Slate Syndicate, from Bangor and Slatington, Pa., *via* the Central Railroad of New Jersey and the Philadelphia & Reading, through the Central States Dispatch. The train was 1,380 feet long, and was drawn by two powerful engines. The shipment comprised consignments for distribution in ten States, viz., Virginia, West Virginia, Ohio, Kentucky, Indiana, Illinois, Missouri, Iowa, Wisconsin and Minnesota.

Moving a Masonry House.

The Sage house, Brooklyn and St. Mark's Avenues, Brooklyn, N. Y., has been successfully moved by B. C. Miller & Son, house movers. The building is of stone, about 1,300 tons, built by a son of a Mr. Russell Sage. It has been moved 30 feet toward St. Mark's Avenue and 20½ feet toward Brooklyn Avenue, and has been raised 2½ feet on its foundations.

THE "ROYAL" DOOR CHECK AND SPRING.

This is a simple, compact, strong, and durable device, having a compressed-air check, and consequently not liable to freeze up or leak. It is sold by W. H. Quinn & Co.,



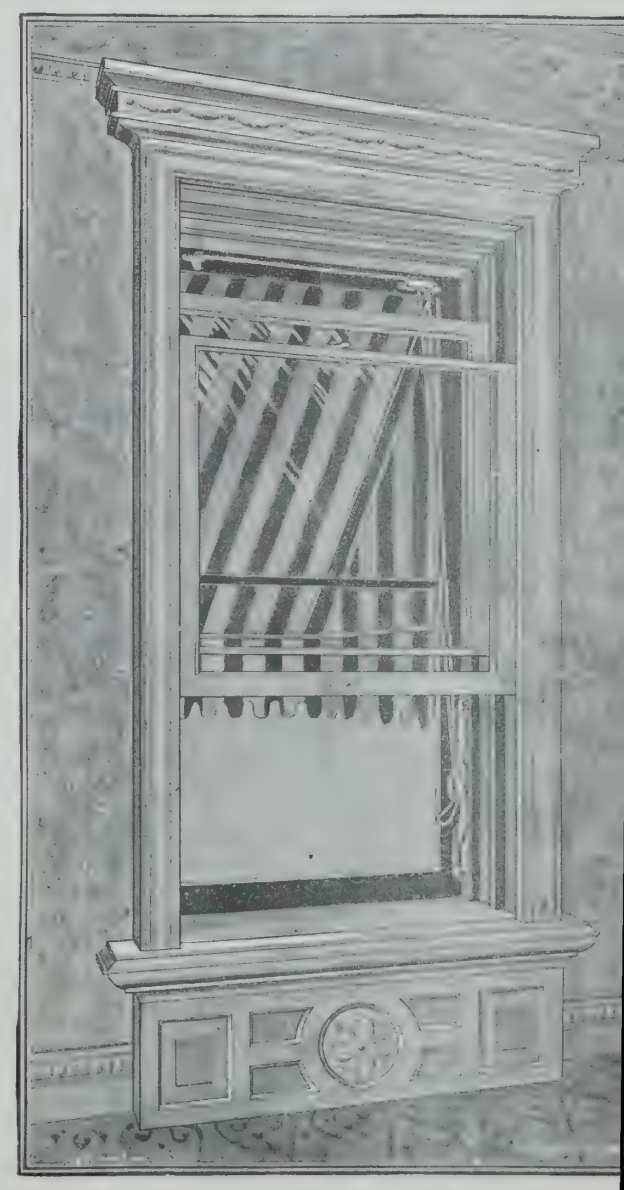
THE "ROYAL" DOOR CHECK AND SPRING.

105 Chambers Street, New York. It is easy of attachment, without requiring the help of a skilled mechanic, has an improved ratchet for increasing the tension of the spring, will fit right or left hand doors, and doors upon which it is placed open easily, as there is no back suction. It is one of the latest improved devices in this line, and sells at a lower figure than such articles have heretofore been offered at.

THE J. Bardsley door spring hinges, checks, etc. (made by J. Bardsley, 153 Baxter Street, New York), are in use throughout the splendid new Postal Telegraph Cable Building, one of the handsomest and most expensively fitted up buildings of the business structures of modern New York.

AN IMPROVED WINDOW SCREEN AND AWNING.

The "Phenix" hanger, for hanging storm sash and entire screens, has been proved to be a most simple and practically useful invention, and the combined window screen and awning, shown in the illustration, are thus made to be conveniently operated, and readily put up or removed from the inside. The screen is for the full length of the window, and the awning is attached directly to the screen sash, the awning being operated from the inside of the building by cords and patent pulleys running through the screen. The Phenix Manufacturing Co., of 278 Third Street, Milwaukee, Wis., are the manu-

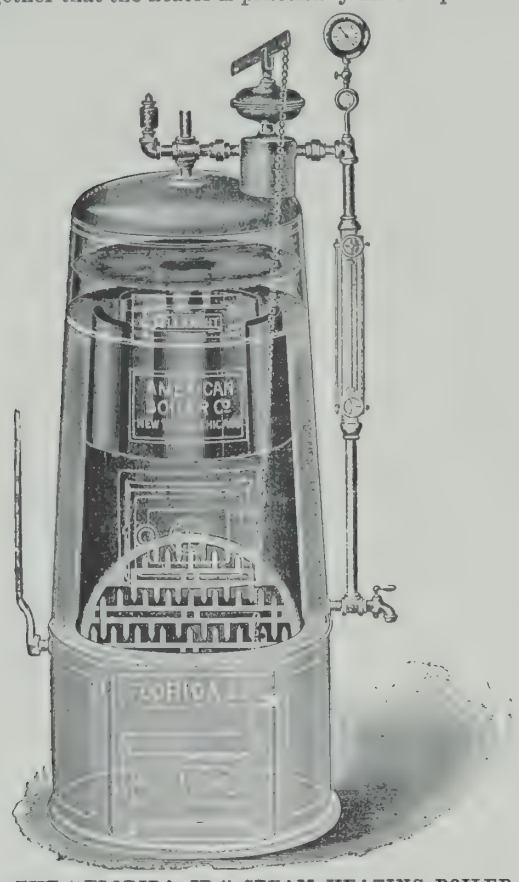


THE "PHENIX" COMBINED WINDOW SCREEN AND AWNING.

facturers of this improvement. The awning and screen, when not needed, may be stored in small space, and may be placed in position again as required without expert labor.

AN IMPROVED STEAM HEATING BOILER.

The boiler shown in the accompanying illustration, made by the American Boiler Co., of Chicago and New York, is simple in construction and easily operated, is always safe, and possesses a high degree of efficiency on a small consumption of coal. There are but few joints, and the parts are so well fitted together that the heater is practically all one piece. The

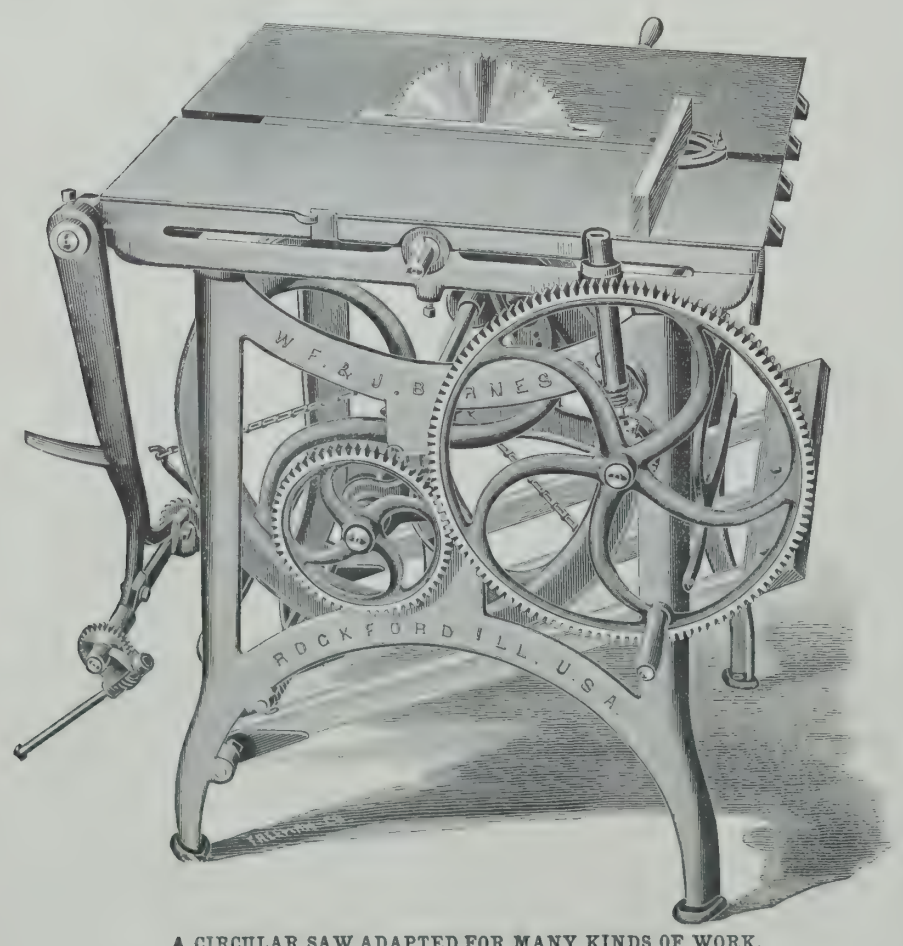


THE "FLORIDA, JR." STEAM HEATING BOILER.

water section and the dome are connected by a screwed nipple joint, making leakage at that point impossible The flow pipe rises from the apex of the heater, thus making it convenient for any system of piping. A clean-out door and a clinker-door below, and a fire-door and another clean-out door above, render the cleaning of the heater a very simple and easy matter. An improved combined rocking and dumping grate makes it very easy to remove all ashes and clinkers. These boilers are tested up to eighty pounds per square inch before leaving the factory.

IMPROVED WOODWORKING MACHINERY.

There are two classes of foot power machinery, one designed for amusement and recreation, and the other for practical workshop use, and among the more efficient machines in the latter class are those made by the W. F. & John Barnes Co., of 567 Ruby St., Rockford, Ill., an improved circular saw of their manufacture forming the subject of the accompanying illustration. It is operated by either hand or foot power, and is especially well adapted for the workof carpenters and builders, cabinet makers, picture frame makers, and all who wish a good, strong, practical machine. It has a self-feed which can be readily regulated for hard or soft, or thick or thin lumber, being self-adjusting for lumber of uneven thicknesses. With the self-feed mechanism and the rip gauge thrown to the rear, as shown in the illustration, it forms a cross-cut saw, the cut-off gauge being set at any required angle, the changes being made without requiring the use of a wrench, or the removal of any bolts or nuts, and changes of speed being readily made. For rabbeting and grooving, the cutter heads may be run at speeds which will insure smooth and clean cut work, and the self-feed can be used as well as in ripping. Cutter heads are also used for gaining and dadoing, and with knives of suitable width for jointing, the table being adjustable up and down to regulate the depths of grooves or rabbets. The machine also has a boring attachment. While designed particularly to be run by hand and foot power, it is equally well adapted to be driven by a steam or other motor.



A CIRCULAR SAW ADAPTED FOR MANY KINDS OF WORK.

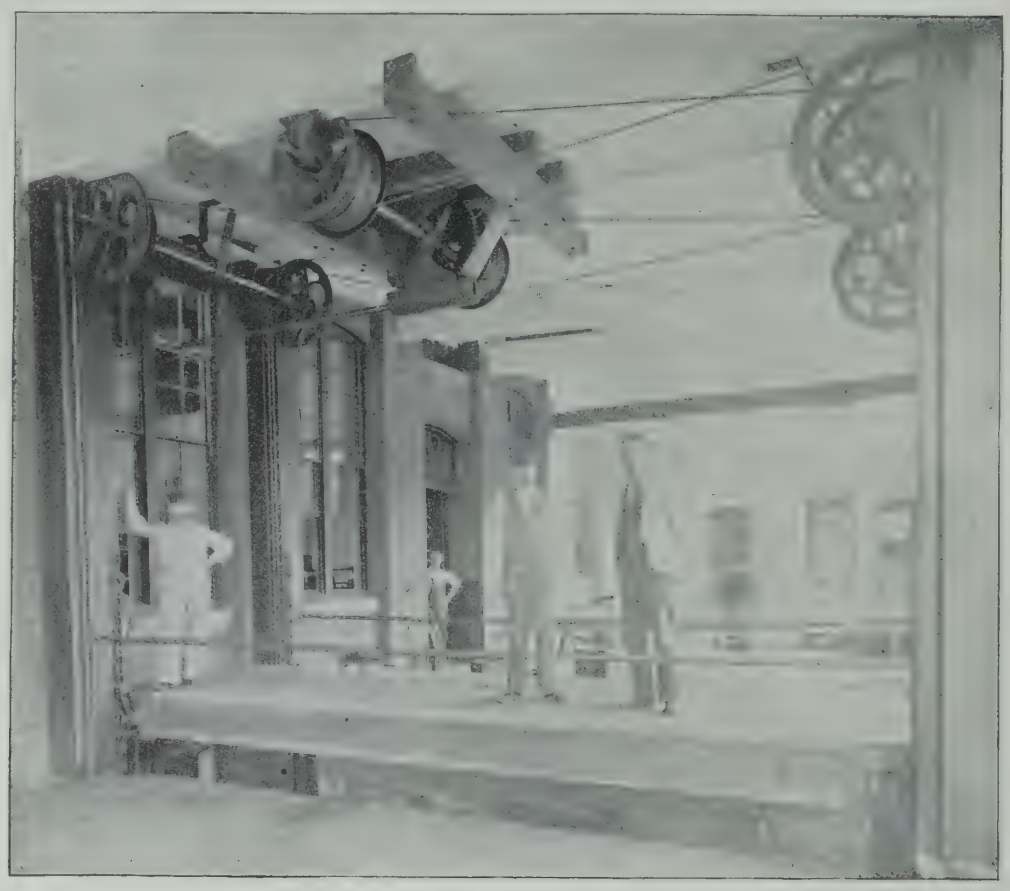
SUCH is the clearness of the atmosphere in the vicinity of Arequipa, Peru, that from the observatory, 8,050 feet above the sea, a black spot one inch in diameter, placed on a white disk, has been seen on Mt. Charchani, a distance of eleven miles, through a thirteen inch telescope.

Painting Iron Work.

In a recent communication to the American Society of Civil Engineers, Mr. E. Gerber gives the results of a careful investigation into the present state of a number of bridges which had been painted with one of several classes of paint. In all cases rust was found to a greater or less extent, occurring always in spots in the centre of clean metal. Most of this, however, was thin, and was as bad in new structures as in old. It was, however, found that the iron oxide paints adhere more firmly to the metal than the lead paints, only one case being found in which the latter adhered well and was tough. It is, however, suggested that much of this brittleness was due to adulteration of the oil by turpentine, benzine, or other petroleum products. There is more likelihood of such adulteration with lead paints than with iron, as they are more difficult to spread, and there is thus more temptation to dilute the oil. In some cases, bridges, coated with iron oxide eleven or twelve years ago, were still in good condition, without having been repainted. Only two of the bridges examined had been painted with carbon or asphaltum paints, but the condition of things in these two cases was found to be not altogether satisfactory, as in neither case was the coating tough and adherent. The metal had, however, been protected by them. Mr. Gerber considers that too little attention has, in the past, been paid to thoroughly cleaning the metal before the first coat of paint is applied. Most of the rust spots found had apparently been there from the outset, and had done no harm so long as not too far advanced. The best plan of securing clean surfaces, in Mr. Gerber's opinion, would be to coat the metal with linseed oil as it left the rolls.

A NEW AND POWERFUL ELEVATOR.

The accompanying illustration represents an elevator of two tons capacity, lately completed by Volney W. Mason & Co., of Providence, R. I., for the General Fire Extinguisher Company, of that city. The car or platform, 22 by 7 ft., weighing about 1,600 pounds, is overbalanced about 900 pounds, so that, when ordinarily loaded, little power is required to hoist at its regular speed of 60 feet per minute, and, with its heaviest loads, much less power than usual is required. Its safety is also of a different pattern from others heretofore made, no springs or traps being employed, it being a new adaptation of the Mason patent zigzag or pendulum motion, in which any accelerated motion of the car causes the pawls to engage in the teeth or rack guides; whether the rope breaks, or from any cause, the car is promptly stopped when its speed beyond a safe limit is increased. This safety has never failed to act. The simplicity of the whole apparatus is a most striking feature.



A NEW AND POWERFUL ELEVATOR.

The driving mechanism is simply two iron disk cones, acting on a central paper-friction cone, driven by a single belt and shipping wheel, arranged to throw either side of the cone into action, by friction. The whole apparatus, being overhead, is out of the way, and occupies no valuable floor space (as most heavy elevator machinery usually does). All belt shifting is avoided; it is operated by a single belt, instead of two belts as usual, thereby saving much in friction, wear and tear of loose pulleys, etc., and in operation is almost entirely noiseless.

Messrs. Volney W. Mason & Co. make a specialty of elevators and hoisting machinery, and several of the largest plants in this country, notably the N. Y. C. & H. R. R. R. Co.'s new hay depot, 33d Street and 11th Avenue, New York, and L. Palmer's depot, in Brooklyn, and many other storehouses in that city, the Providence Warehouse Co., and Boston, Atlas & Constitution Wharf Co.'s stores, have been equipped by them.

Cheap Flour or Middlings in Paint.

"There is no doubt in my mind," said an experienced observer recently, "that lead and oil is the stuff to wear; and for outside work, if 20 to 25 per cent. of cheap flour (or fancy middlings, or 'Red Dog') is mixed into the paint, it will dry into a splendid hard metallic surface, that will wear like iron." This we had never heard of before, but he said he had seen it tested, and proved that there was something in the gluten of the flour or middlings that, combining with the lead and oil, made that "hard" surface so desirable in outside work. This is important, if true, as the addition of that quantity of flour (or fancy middlings) would somewhat reduce the cost of the paint at the same time we were getting the "hard" surface.

If the united testimony of experienced men is to be relied upon, lead and linseed oil would seem to be the paint to use. The question would come up, "What lead?" and we have, fortunately, the answer of the associated manufacturers called the National Lead Co., which gives the "brands" of 22 manufacturers which are guaranteed to be pure white lead. We do not say that other makes of lead are adulterated, but we do believe these brands of lead are pure lead, hence we shall look out to get a reliable make when we are buying. With the "tinting colors," which they also manufacture, any desired shade (or tint) can be made—and we shall then be certain that we have got "the best."—*Farm-Poultry, July 1st.*

SCIENTIFIC AMERICAN.

Building Edition.

ESTABLISHED 1884. [Entered at the Post Office of New York, N. Y., as Second Class matter. Copyright, 1895, by Munn & Co.] PUBLISHED MONTHLY.

Vol XX. No. 6. NEW YORK, DECEMBER, 1895. Subscription, $2.50 a Year. Single Copies, 25 Cents.

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A RESIDENCE AT EAST ORANGE, N. J.—See page 82.

Scientific American.

ESTABLISHED 1845.

MUNN & Co., Editors and Proprietors,

No. 361 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

NEW YORK, DECEMBER, 1895.

THE

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A RESIDENCE AT EAST ORANGE, N. J.

Our views and plans on pages 81, 83, and 85 illustrate the residence of C. M. Coburn, Esq., on Arlington Avenue, East Orange, N. J. The design is well treated, detail being in the Colonial style. The main features are the circular bay, with the first story of stone, joints well broken, same as underpinning; the porte-cochère on same line as porch; roof similarly supported, by Tuscan columns, and the frieze band of tiles, burnt sienna in color, with scroll ornamentation. Leaded glass has been effectively introduced. Underpinning, stone; first story, except at bay, clapboarded and painted light yellow; all above, shingled; side, gray; roof, snuff brown; trimmings, light yellow and deep gray; blinds and sash, green; chimneys of brick, capped with stone. Dimensions: Front, 43 ft.; side, 65 ft. 9 in., including bay projections. Heights: Cellar, 8 ft.; first story, 10 ft. 3 in.; second, 9 ft. 6 in.; attic, 9 ft. The plans show a convenient arrangement of rooms; vestibule with mosaic floor, and walls covered with lincrusta Walton, opens with wide door on to the main hall, with tiled fireplace and carved mantel of special design beneath staircase landing. Seat in bay and at stairs, which are of easy rise, with ornamental newel formed by eight balusters on a base, supporting wrought iron candelabra, three balusters to the tread; finish, quartered oak; sliding doors to parlor, in white and gold; fireplace tiled in light yellow, and walls covered with embossed hangings. Library has angle fireplace, tiled in light green, and bookcases trimmed in cherry. Dining-room, in quartered oak, connects through butler's pantry with kitchen, complete with usual fixtures. Generous closet room throughout. Second floor divided into four chambers, sewing and two bath rooms, with exposed plumbing of best make, and closets. Attic has two bed and store rooms, as well as large billiard room finished off. Cellar, cemented, contains steam heater, fuel storage and cold room. Cost complete, $14,000. S. W. Whittemore, Esq., architect, East Orange, N. J.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A HOUSE AT MADISON, N. J.

We show on page 84 of this number of SCIENTIFIC AMERICAN a design of a Colonial house, which is remarkably well adapted for the wants of suburban residents On the first story there is a broad veranda extending around three sides, an ample reception hall, and small reception parlor. Adjoining these are the drawing-room and dining-room, each with an open fireplace. Back of the drawing-room is the library, or den, also with an open fireplace and bay window. There are an ample butler's pantry, and laundry in kitchen. The second floor contains five bedrooms and a bathroom, and in the third story are two finished bedrooms and an ample storeroom. The house was finished complete in the best workmanship and materials, plumbing, wired for electricity, for $5,500. It was built from the plans and under the supervision of Child & De Goll, architects, 62 New Street, New York.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT MONTCLAIR, N. J.

On pages 88, 89, we illustrate a dwelling at Montclair, N. J., the residence of Geo. Welwood Murray, Esq. Dimensions: Front, 47 ft.; side, 38 ft., exclusive of porch or veranda projections. Heights: Cellar, 8 ft. 2 in.; first story, 10 ft. 4 in; second, 9 ft. 4 in.; attic, 8 ft. 3 in. Our views show a well-proportioned exterior in the Colonial style, with broad entrance porch (which it is the intention to run the full front and side, connecting with rear circular veranda). Ovals and pedimented window for central feature; dormers of broad treatment, and deck with goose-necked rail, relieve the roof lines. Circular veranda and loggia in rear, with entrances from rooms thereon, give a broad outlook over the expanse of scenery. Underpinning of local stone, 18 in. in thickness, cemented, tinted, and joints lined off on principal sides, which is ultimately to be covered up as mentioned above, rock-faced stone being used in rear, joints of red mortar. Exterior framework above, sheathed, papered, shingled, and, stained snuff brown. Roof shingled and left to weather. Trimming color, cream white. Blinds painted dark green. The first floor plan shows a reception hall of good size, having fireplace tiled with green tiles and mantel with mirror, supported by long columns. Staircase has ornamental newel and turned balusters. Library with angle fireplace, and the dining-room finished in ash. Parlor finished in birch, has fireplace tiled (burnt sienna in color), and mirrored mantel above. Butler's pantry with dressers, sink and china closet, connects with dining-room by double swing door, and forms passage to kitchen, complete with the usual fixtures, and large store-room; finish, Georgia pine. Second floor finished in whitewood, natural, is divided into three chambers, with dressing-rooms and wardrobes. Sewing and bath rooms, the latter having porcelain tub and all fixtures of best make; slop sink in housemaid's closet; plumbing throughout is entirely exposed and nickelplated. Attic has servant's, trunk, and storage rooms, all heated. Cellar, cemented, has laundry with three wash trays of porcelain, larder, storage space with hanging shelves and fuel bins. House is heated by the Gurney hot-water system, and lighted by gas. Wm. E. Bloodgood, Esq., architect, 64 Cedar Street, New York City.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT BRICK CHURCH, N. J.

We illustrate on pages 86 and 87 a cottage recently completed for Thomas J. Check, Esq., at Brick Church, N. J. Our views show an inexpensive yet pleasing exterior; a well shaded entrance porch with field stone work, grouping of windows, with sash divided by wooden muntons, bay window supported by brackets and ornamental frieze bands, being principal features. Underpinning of brick, with stone sills for cellar windows; exterior framework above being sheathed, papered and clapboarded on first story (painted yellow); second story and gables being shingled and stained brown; roof, gray slate. Trimming color, cream white; blinds painted dark green. Dimensions: Front, 25 ft.; side, 35 ft. 9 in.; including extension. Heights: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; attic, 8 ft. The first story plan shows an economical arrangement of rooms; entrance door has beveled plate glass in upper panel; hall with staircase having ornamental newel and turned balusters, two to the tread, finished in ash. Parlor has mullioned window, hardwood mantel, and sliding doors to dining-room, with wide bay and angle fireplace; pantry contains dresser and closet; kitchen complete with all fixtures, including two wash trays, range bricked in. Second floor, divided into three chambers of good size, with closets and bathroom complete with usual fixtures of good make. This room is ceiled entirely with yellow pine, 2½ inch strips. Attic has two rooms finished off, trimmed throughout, except where noted, white pine, natural finish; cellar, cemented, contains hot air furnace (every room being heated) and fuel storage; house lighted by gas, fixtures of neat design being included in the cost, $2,700. Frederick R. Hassman, Esq., Architect, Decker Building, Orange, N. J.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

THE NEW CITY HALL, PHILADELPHIA.

No one has visited Philadelphia of late years without being struck by the imposing pile which we illustrate. This great work, which has cost the city of Philadelphia an enormous sum of money, is now practically completed. This immense building covers four and a half acres, without including the court.

The great pile of white marble, larger than any other single building on this continent, is surrounded by a grand avenue, 135 ft. wide on the eastern, western, and southern fronts, and 205 ft. wide on the northern front. The dimensions are 470 ft. from east to west, 486½ ft. from north to south. The structure contains 750 rooms, fitted with every convenience in heat, light, and ventilation, the whole being absolutely fireproof and indestructible. Its cost has been over $20,000,000.

On the north front of the building rises the tall tower, surmounted by a heroic statue of William Penn, 36½ ft. in height. From the sidewalk to the crown of Penn's broad-brimmed hat the distance is 547 ft. 3½ in.

The work on the City Hall at Philadelphia was begun by the late John McArthur, Jr., and was carried out by John Ord. The iron tower which crowns the stonework is a remarkable piece of engineering, and makes the New City Hall of Philadelphia the highest building in the world, with the exception of the Washington Monument and the Eiffel Tower. An interesting feature of the tower is the treating parts of it so they will not rust. This was accomplished by plating with aluminum as described in the SCIENTIFIC AMERICAN for October 22, 1892.

The next highest building on earth is the Cologne Cathedral, 510 ft. The Washington Monument is 32½ in. higher, but cannot be properly classed as a building in the same sense as the City Hall. The latter will be 67 ft. higher than the great pyramid, 100 ft. higher than St. Peter's, Rome, and 187 ft. higher than St. Paul's, London, while it nearly doubles in altitude the Capitol at Washington.

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THE BOSTON PUBLIC LIBRARY.

The famous Boston Library has always been an object of pride to the inhabitants of that city. For many years its literary hospitality has been dispensed from the old building in Boylston Street, but as the structure was inadequate to store the magnificent collection of books, which now numbers 650,000 volumes, it was decided to erect a new building. We present, page 90, an engraving of the façade of the new library. It fronts on Copley Square, thus being in the centre of the best part of Boston. The architects were McKim, Meade & White, of New York City. The building is built in the Renaissance style, and is to a great extent based upon the Bibliothèque St. Geneviève, at Paris. The building is 225 ft. long, 227 ft. deep, and the cornice is 70 ft. above the sidewalk. The great central reading room runs across the entire front of the building, and is 218 ft. long, 42½ ft. wide, 50 ft. high. The room is furnished with tables and chairs for readers, who have direct access to a large number of books which are shelved in this hall. At the end of the room is the great card catalogue. Immediately back of this reading room, which is called "Bates Hall," is a great quadrangle, or open court, surrounded by a beautiful arcade of columns, with a fountain in the centre. The portion of the building which lies between the courtyard and Copley Square is devoted to the administrative officers of the library, to Bates Hall, and to certain special collections. The stack rooms occupy the buildings on the other side of the central court. The great building is here divided into six stories by low ceilings, and is occupied by simple pine shelves, on which the books are stacked. The stack rooms are lighted with incandescent lamps. A most ingenious system of distributing books to the readers has been devised. It consists of a very perfect cable railroad driven by electricity, the orders being transmitted to the various attendants by pneumatic tubes. The reader's slip is placed in a cylindrical box, and is sent through a pneumatic tube to the stack room; here it is received by the attendant, who gets the book, places it on a car, and starts the car on its journey. Rapidly moving cables catch the car grip and draw the car from the stack room directly to the distributing desk, if on the same floor; if not, to an elevator, which automatically transfers it to the delivery room floor, where the book is received and handed to the applicant. Books are returned to the stack room in the same manner. This interesting system was described in detail in the SCIENTIFIC AMERICAN for November 9, 1895, where other features of the building are also illustrated.

RESIDENCE AT BENSONHURST-BY-THE-SEA, L. I.

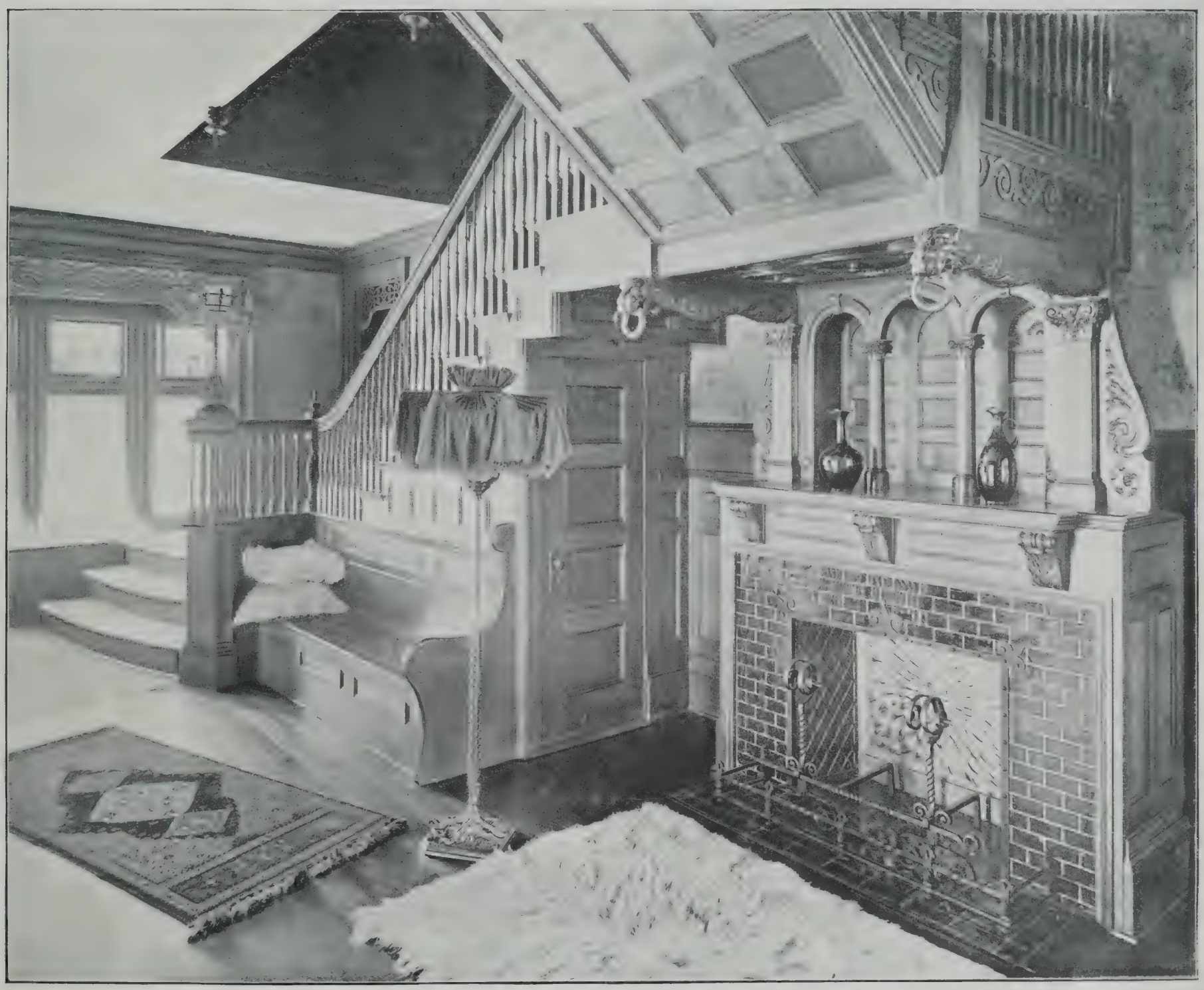
The subject of illustration on pages 90 and 91 is the residence of Geo. W. Catt, Esq., at Bensonhurst-by-the-Sea, L. I. Our views show an interesting and original exterior, having broad, well-shaded veranda, Tuscan columns on wash brick piers supporting roof above, projecting bays, bold treatment of gables and dormers, and octagonal tower at corner, being the principal features. Dimensions: Front, 48 ft.; side, 52 ft. 6 in., including veranda projection. Heights: Cellar, 8 ft.; first story, 10 ft.; second 9 ft. 6 in.; attic, 8 ft. Underpinning of brick, stone sills to cellar windows; exterior framework above, sheathed, papered, clapboarded, and painted light yellow on first story, all above being shingled and stained brown; trimming color, light yellow; blinds, deeper. The first floor plan shows a broad entrance door, having long beveled glass panel; vestibule and hall with hardwood floor; sliding doors to library, with open fireplace, bay and alcove; broad opening to dining-room, having bay and angle fireplace; all floors of hardwood finish, quartered oak. Parlor, white enameled, has double arched opening to hall, with angle columns; staircase of pleasing design and easy rise; ornamental newel and turned balusters in oak. Butler's pantry has sink and dresser. Kitchen complete, with usual fixtures, including dumbwaiter to cellar and second floor; all finished in cypress; plate glass used in principal rooms. Second floor plan shows four chambers, principal one having fireplace. Study and bathroom, with all fixtures of best make, all plumbing exposed. Hall, servant's room, and tower finished off in attic. Cellar, cemented, contains laundry, servant's water-closet, hot water heater, and fuel storage. House is plastered with hard plaster, sand-float finish, tinted in water color, and was built under the supervision of the architect, Stanley S. Covert, Esq., 19 Park Place, New York City, and cost complete $8,500.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT OAKWOOD, STATEN ISLAND.

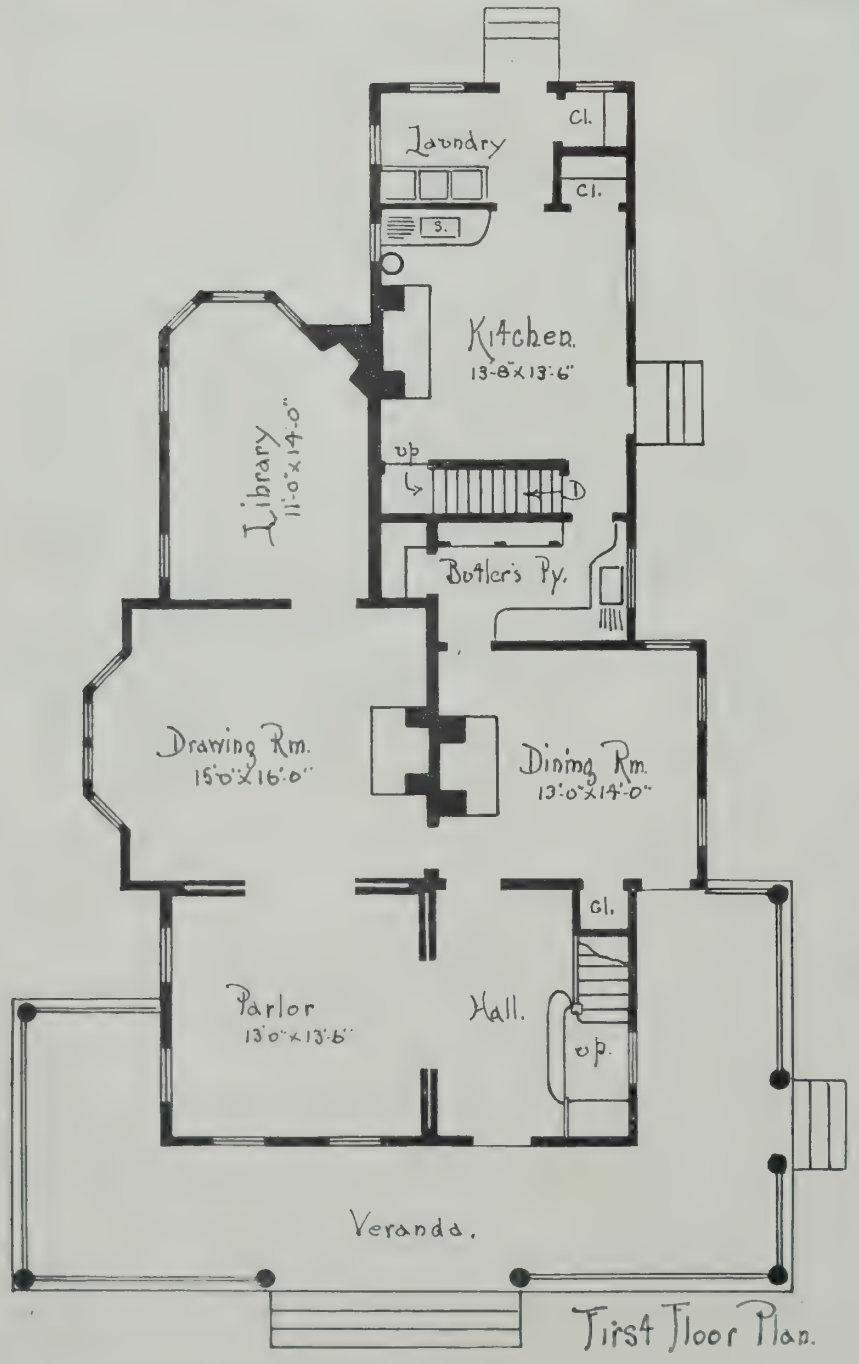
The perspectives and floor plans presented on page 93 illustrate a cottage of low cost, which has been erected for Messrs. Hughes & Ross, real estate merchants, at Oakwood, Staten Island. The underpinning is built of local red brick, laid up in red mortar. The first story is built of wood, and is clapboarded and painted olive yellow, with white trimmings; second story is shingled and stained sienna. The roof is shingled and painted red. Dimensions: Front, 28 ft.; side, 34 ft., not including porch. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior is trimmed throughout with white pine, and finished natural. The hall contains an ornamental staircase turned out of ash, with newel posts and balusters. The parlor has a bay window, which rises into a tower, and it contains a false fireplace, with tiled trimmings, and a mantel, with mirror. Dining-room is separated by sliding doors. Butler's pantry and kitchen are wainscoted and trimmed with North Carolina pine, and they are fitted up complete. The second floor contains four bedrooms and bathroom, the latter wainscoted, and furnished with the usual fixtures. The third floor contains ample storage. Cemented cellar contains furnace and other necessary apartments. Cost $2,800, including furnace, range, and all plumbing complete.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

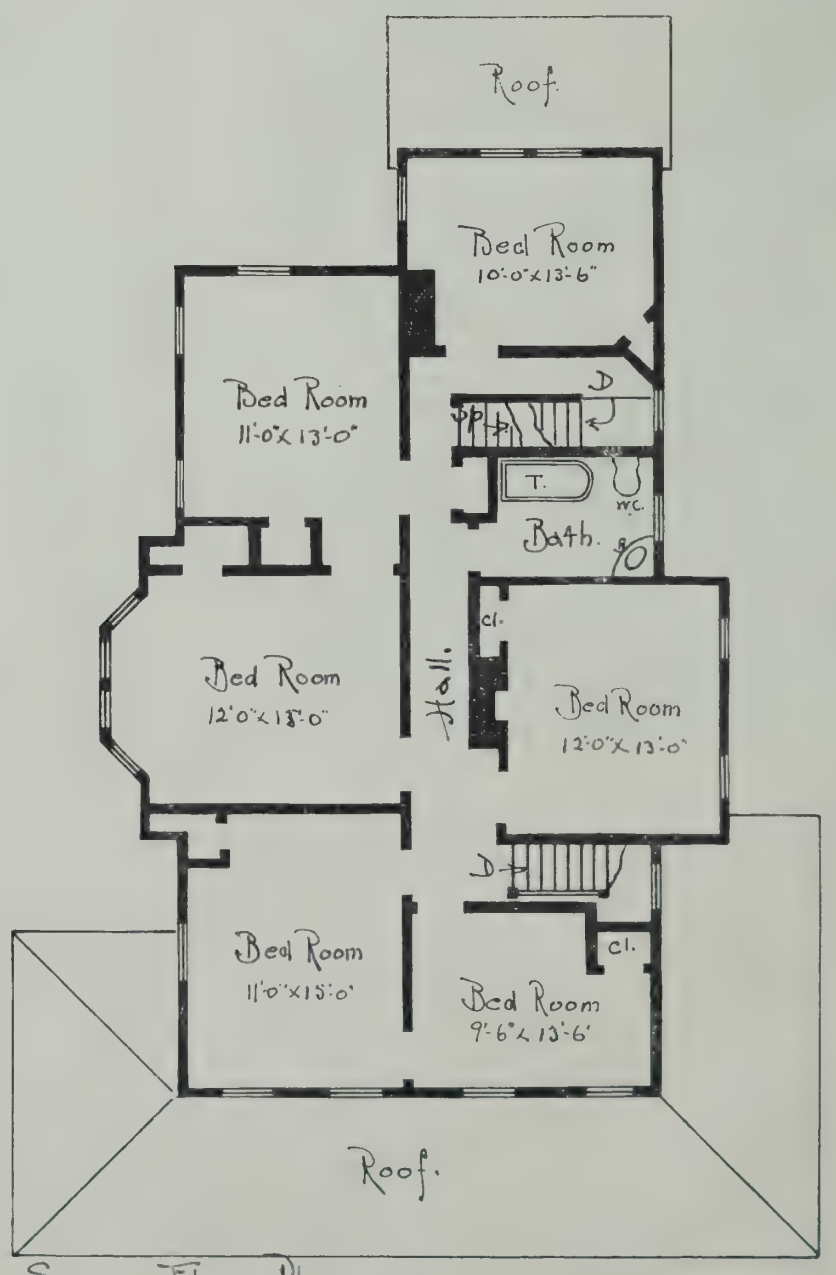


A RESIDENCE AT EAST ORANGE, N. J.—See page 82.

THE present number brings to a close another year in the history of this publication. We hope all our subscribers will send in the renewals of their subscriptions very promptly, and, in doing so, also send the names of friends who become new subscribers. This will greatly aid and encourage us in the improvement of the work, and rendering it more valuable to all.



First Floor Plan.



Second Floor Plan.

A HOUSE AT MADISON, N. J.—See page 82.

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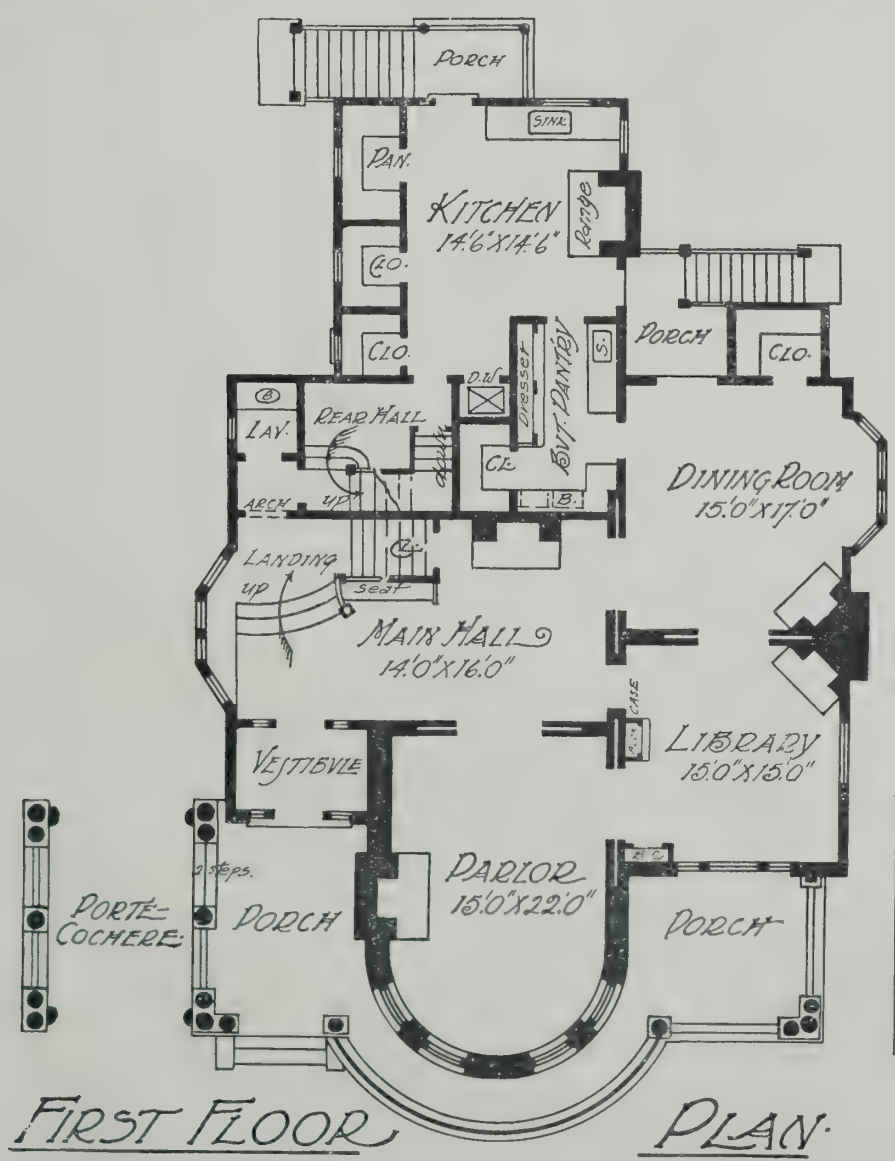
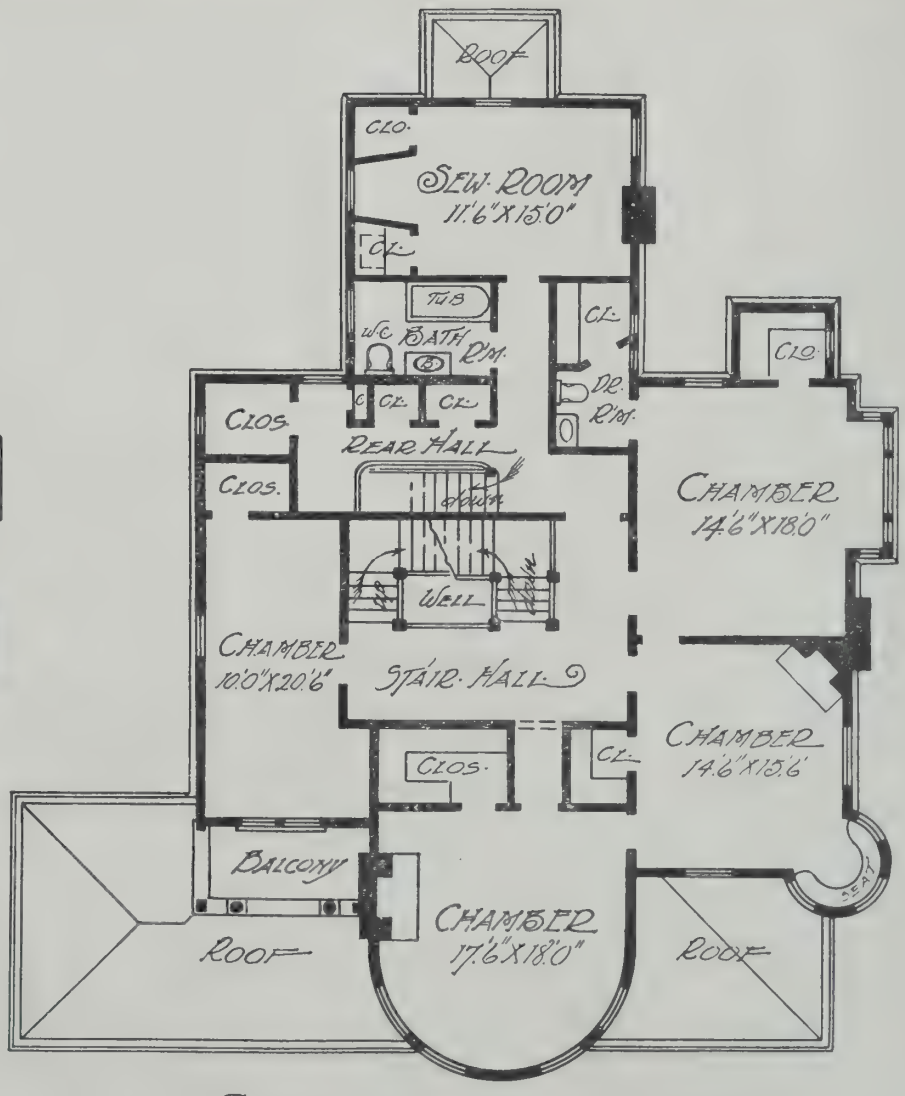


FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

A RESIDENCE AT EAST ORANGE, N. J.—See page 82.

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A COTTAGE AT BRICK CHURCH, N. J.—See page 82.

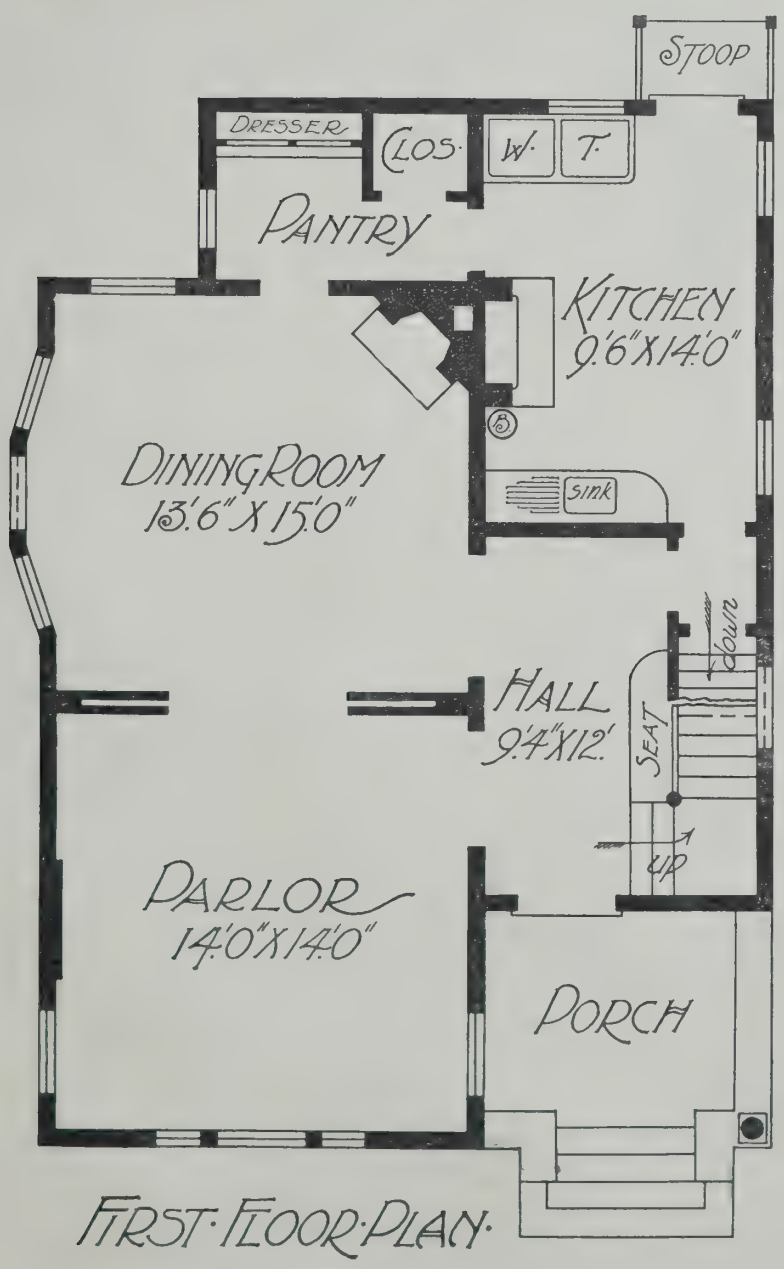
Testing House Pipes and Drains.

A good article on this subject, calculated to enlighten owners and occupants as well as plumbers, may be found in Domestic Engineering for September. These tests are named the water test, the smoke test, and the peppermint test. Presuming that the pipes are all in place and connected, but yet uncovered and all openings closed by plugs (there is a variety of plugs for this purpose, generally constructed to become tight by expansion under pressure of a screw), the entire system is then filled with water. If the water at the highest point does not settle away after standing some time, the system is watertight. Connections should then be completed. If the water settles, there are leaks, which should be carefully sought out and stopped. After the connections of the fixtures are made, the system should be tested again. This may be done by the smoke test, or the peppermint test, or both in succession. The peppermint test is considered by most plumbers the more delicate, but it is more difficult to apply. The smoke test is performed by generating smoke and forcing it into the pipes, while all windows, doors, or other openings which permit free circulation of air into and through the building are closed. If smoke is detected anywhere in the building, there are leaks, which may be discovered by the visible escape of smoke therefrom.

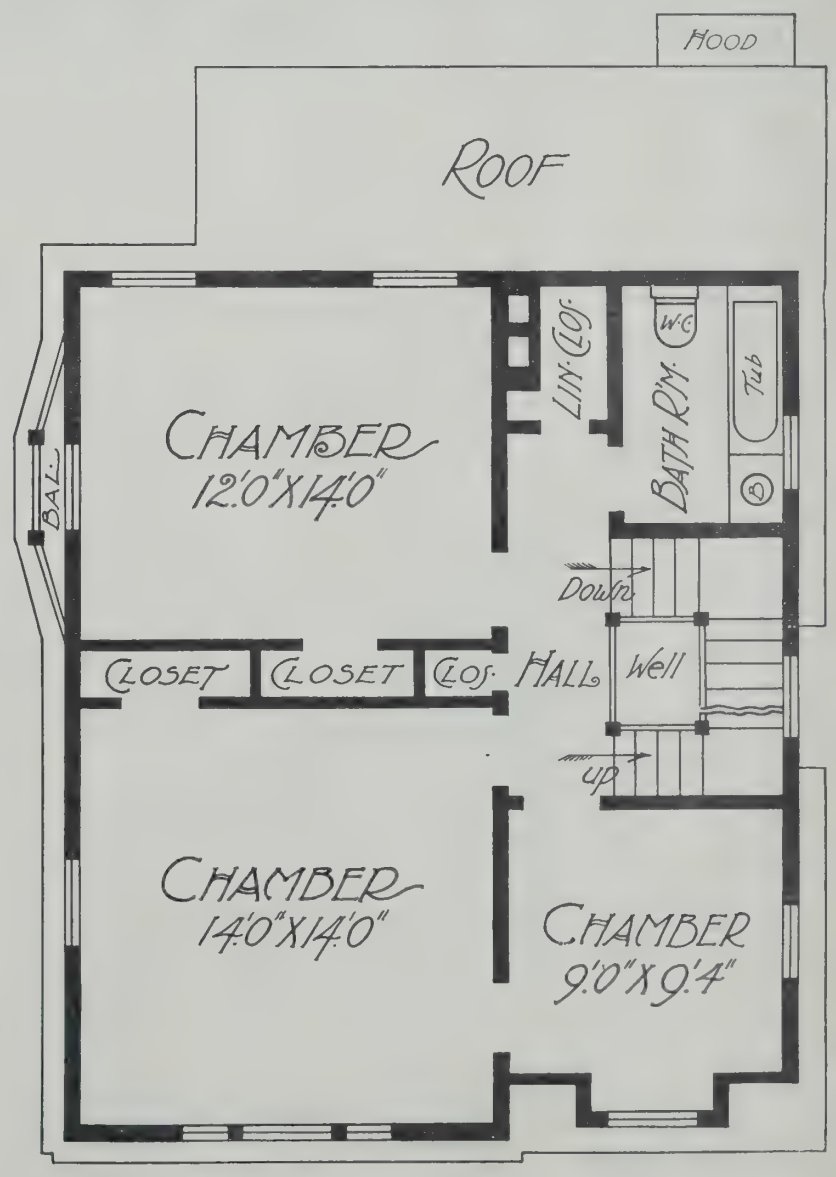
The peppermint test is applied by taking a small bottle of oil of peppermint and a can of boiling water on the roof, and pouring it down the soil pipe, immediately closing the top, and having some one in the house detect if any smell of peppermint becomes apparent, and where it comes from. This test requires delicate handling, and is troublesome. The person on the roof will have to remain some time, for, if he comes into the house, he brings the odor of peppermint with him and spoils the test.

Maguire tabulates the following list of fifty-one specific insanitary and dangerous defects actually discovered in inspection of dwelling houses. These may prove suggestive to plumbers who are making inspections of systems of plumbing which are suspected of being defective.

1. Common brick or stone built drains under basement.
2. Large built drains, under or near dwellings.
3. Pipe drains of larger diameter than actually necessary.
4. Pipe drains broken, or with leaking joints, saturating the subsoil with sewage.
5. Pipe drains with built or imperfect junctions.
6. Pipe drains under dwelling without sufficient fall.
7. Pipe drains with fall in the wrong direction.
8. Drains of any kind without proper intercepting traps.
9. Drains of any kind without constant free current of air throughout.
10. Drains without easy means of inspection.
11. Drains carried from public sewer direct under hall door steps and under scullery floor, instead of across open area.
12. Rat burrows from built drains, undermining floors.
13. Rat burrows from public sewers worked along outside pipe drains into houses.
14. Defective connection between soil pipes and drains.
15. Soil pipes inside houses under almost any circumstances.
16. Soil pipes inside or outside without ample ventilation.
17. Soil pipes through pantries, larders, or stores.
18. Defective, badly placed, or ill constructed water closet apparatus and housemaids' slopsinks.
19. Water closet cisterns with overflows joined to soil pipes or drains.
20. Safe trays under water closets joined to soil pipes or drains.
21. Two or more water closets or sinks on one soil pipe, untrapping each other when used.
22. Overflow pipes connected to soil pipes liable to become untrapped, all very dangerous.
23. Water supplies over troughs taken from water closets or other contaminated cisterns, and liable to be used by careless servants to fill bedroom carafes for drinking.
24. Taps for supplying bedroom water fixed over housemaids' slopsinks, liable to be polluted by splash from slops emptying.
25. House cisterns with overflows, joined to soil pipes or drains.
26. Traps of every kind, without ample ventilation to guard them.
27. Scullery sinks connected direct to drains admitting foul air, not only through traps, but through joints of brickwork and plaster all round.
28. Bell taps, with loose covers on scullery sinks.
29. Gullies or traps in floors of sculleries laundries, larders, or basement, etc , connected to drain, and usually dry and untrapped, or full of foul deposit.
30. Ventilating foul air shafts, discharging near chimneys or windows or ventilating openings.
31. Rain pipes used as ventilators for drain discharging foul air near bedroom windows or under roof eaves.
32. Rain pipes used as or connected to soil pipes, likely to freeze soil pipe solid in severe winter.
33. Rain pipes passing down centre of houses connected in any way to drains.
34. Open rain courses from valley gutters, passing under floors to outside down pipes connected to drain.
35. Rain pipes of low roofs, bow windows, or porches connected direct into drain.
36. Ashpits located near larder, pantry, or dwelling.
37. Ashpits liable to let moisture soak into house.
38. Ashpits capable of retaining moisture or unventilated.
39. Rat burrows from defective drains in neighboring premises.
40. Defective drainage or fittings in neighboring premises.
41. Any direct communication with drains of neighboring premises.
42. Water tanks in areas, near ashpits or sculleries, or with any connection of overflow to drain.
43. Bath waste or overflow pipes connected to soil pipes or drains.
44. Wash hand basin wastes or overflows connected to soil pipes or drains.
45. Water closet systems under bedroom or parlor floors.
46. Cesspools near houses, or unventilated anywhere.
47. Cesspools or drains near wells.
48. Drains crossing your house from neighbor's premises.
49. Field or surface water drains, with open joints under basement connected to house drains direct.
50. Damp basements or damp walls.
51. Drinking water defects of source supply or storage.



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

A COTTAGE AT BRICK CHURCH, N. J.—See page 82.

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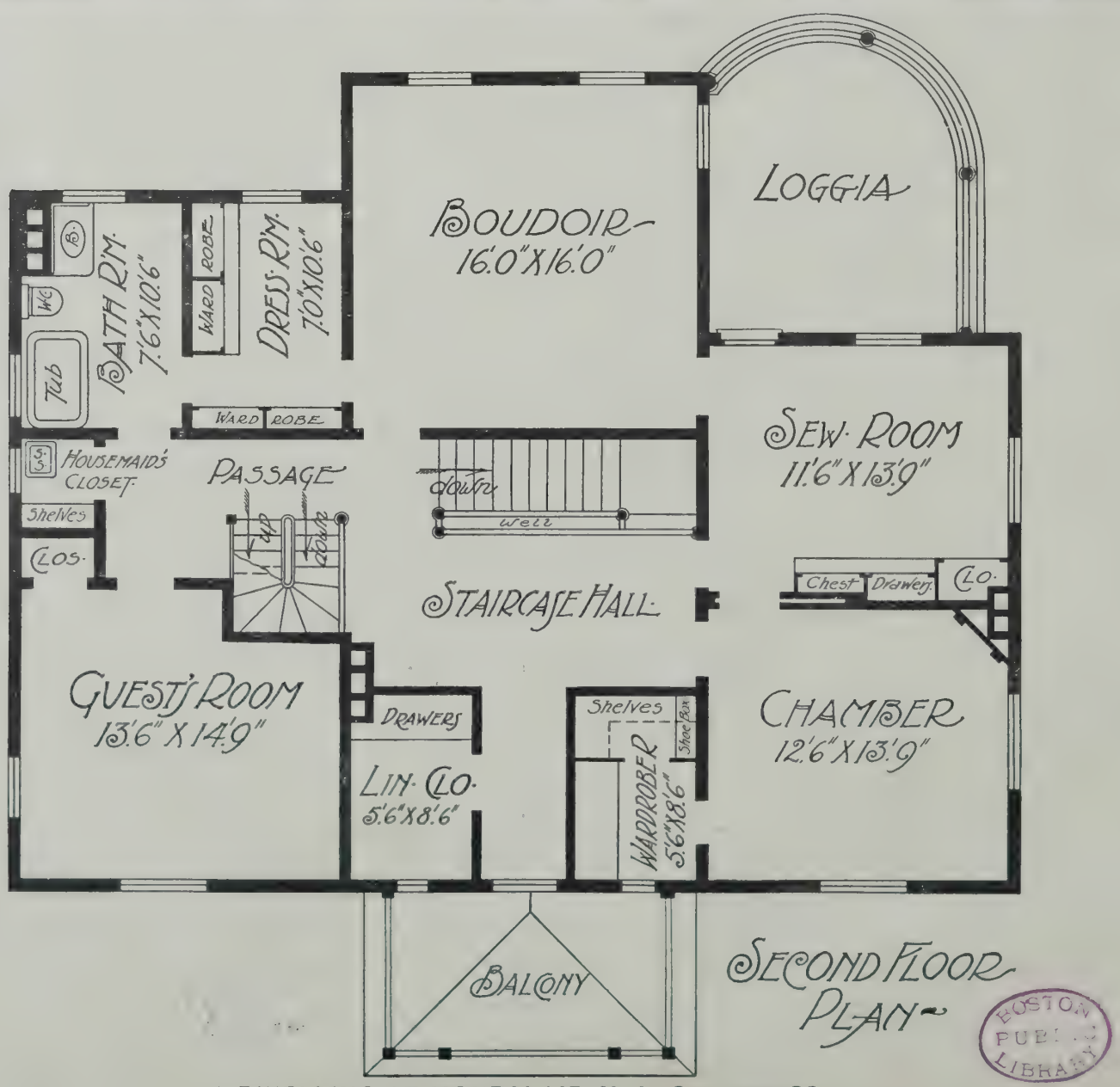

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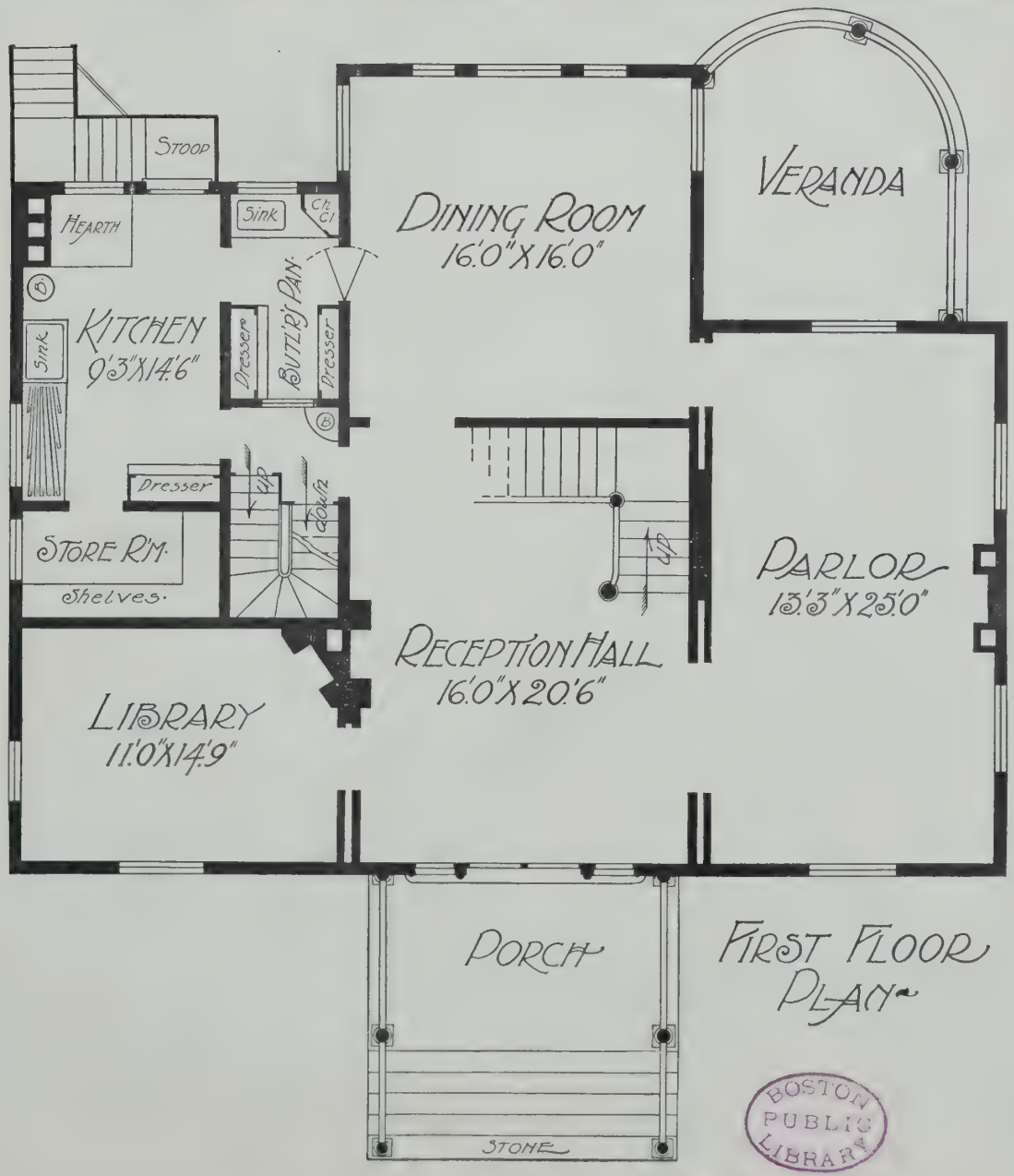
A DWELLING AT MONTCLAIR, N. J.—See page 82.



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A DWELLING AT MONTCLAIR, N. J.—See page 82.

The Permanence of Modern Buildings and Public Works.

If history is to repeat itself in telling the story of the great civilized nations that dominate the world to-day, there is an age coming when the Anglo-Saxon race in both hemispheres will be known only by the monuments of its skill and labors that may happen to survive it.

The colonizing Roman has left enduring monuments of his taste and skill, both as architect and engineer, and the highways that he constructed are to-day, in many cases, the main thoroughfares of the countries through which he originally built them.

The question of the comparative durability of our Nineteenth Century engineering and architectural works is an interesting one.

We will assume—although we see nothing to indicate the fact—that the tide of Western civilization has reached its high water mark, and that in the splendid achievements in the arts and sciences, which have marked the closing years of the Nineteenth Century, the Western races have reached the zenith of their powers. We will assume for the sake of argument that from this time on a decline shall set in which shall ultimately lead to a decrepitude and decay as complete as that of the races of Assyria and Egypt, Greece and Rome—and at the same time ask the question: How many of our great public works will be left standing upon the earth forty centuries hence, to bear witness to our Nineteenth Century knowledge and skill?

Are there in New York, London or Paris buildings that will stand for forty centuries the buffeting of wind and weather as those stately edifices by the Euphrates and Nile have stood? Probably not; nor is the fact any reflection upon the work of the modern builder. It is merely a result of the more artistic modern taste, which expresses itself in a style of architecture that is at once more picturesque and less durable than the gloomy temples and palaces of the ancient builders.

This is the age of steel and iron, materials for construction of which the ancient races appear to have known very little. As compared with stone, they are less durable. Left to itself, an iron or steel structure will, in time, corrode and disappear. Unless the skeleton frames of our modern and lofty buildings be carefully built in and protected from oxidation, it is certain that their life will be limited; for, should the steel work ever be eaten away by rust, there will be no strength in the lower walls adequate to carrying the great superimposed load of the upper stories. This, of course, is not an immediate contingency; but in reckoning the life of buildings—as we are now doing—by centuries, it is an element of decay that may ultimately be responsible for their collapse.

Of the great steel and iron structures, such as the Brooklyn and the Forth bridges, it may safely be said that their life will be contemporaneous with their careful maintenance and repair. The theory of the crystallization of steel under continued stress is now pretty well exploded; and it is generally conceded that, if a steel structure, such as the Brooklyn bridge, which is subject only to static strains, be carefully protected by painting, its life may be indefinitely prolonged. Left to itself, however, as the works of the ancients have been left, the rust eating through the cables would ultimately bring the whole structure into the river, leaving the granite towers as an indestructible monument to mark where the bridge once stood.

The great systems of waterworks, both for municipal supply and for irrigation, will provide many lasting monuments to the energy and skill of the nineteenth century. Nothing constructed in Egypt or Assyria was more durable than is the masonry of the great dam of the Croton waterworks.

In constructing our vast system of railroads, we have written our history in monumental lines of rock and earth, that will probably last as long as this globe turns upon its axis. Should some glacial period return and grind these embankments and cuttings out of existence, there would yet remain the great tunnels, to show with what unconquerable energy we pushed our way even through the heart of the hills themselves.

THE BOSTON PUBLIC LIBRARY.—See page 83.

A RESIDENCE AT BENSONHURST, LONG ISLAND.—See page 83.

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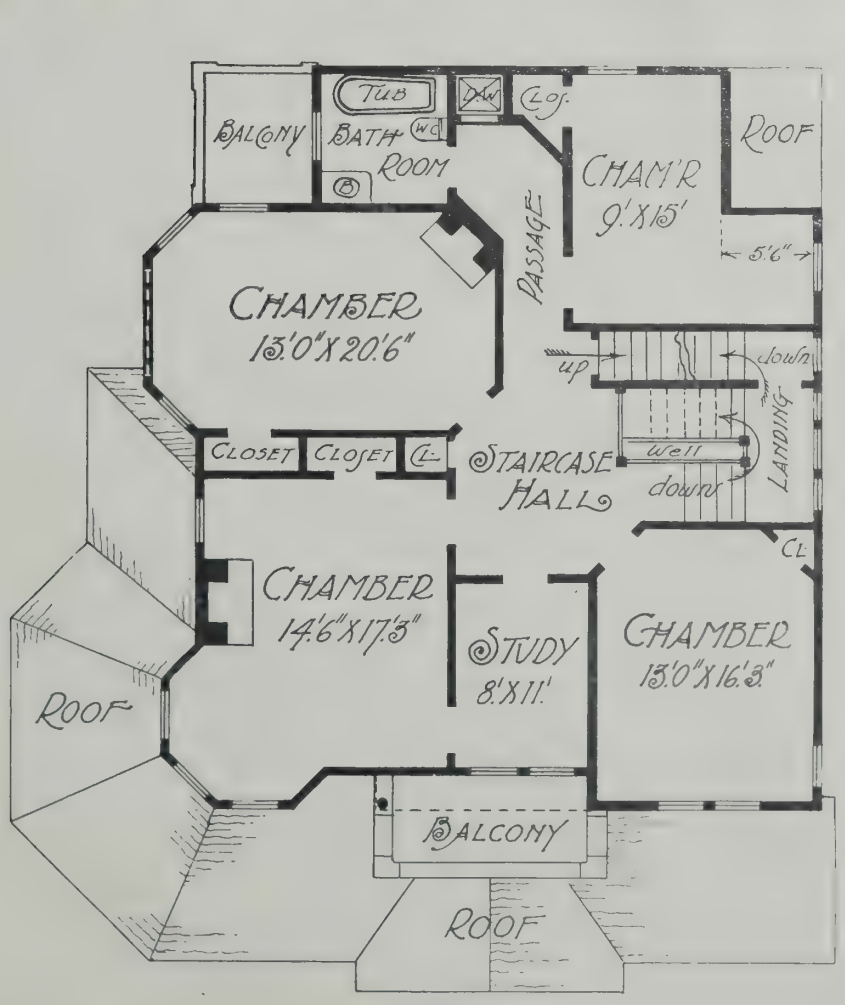
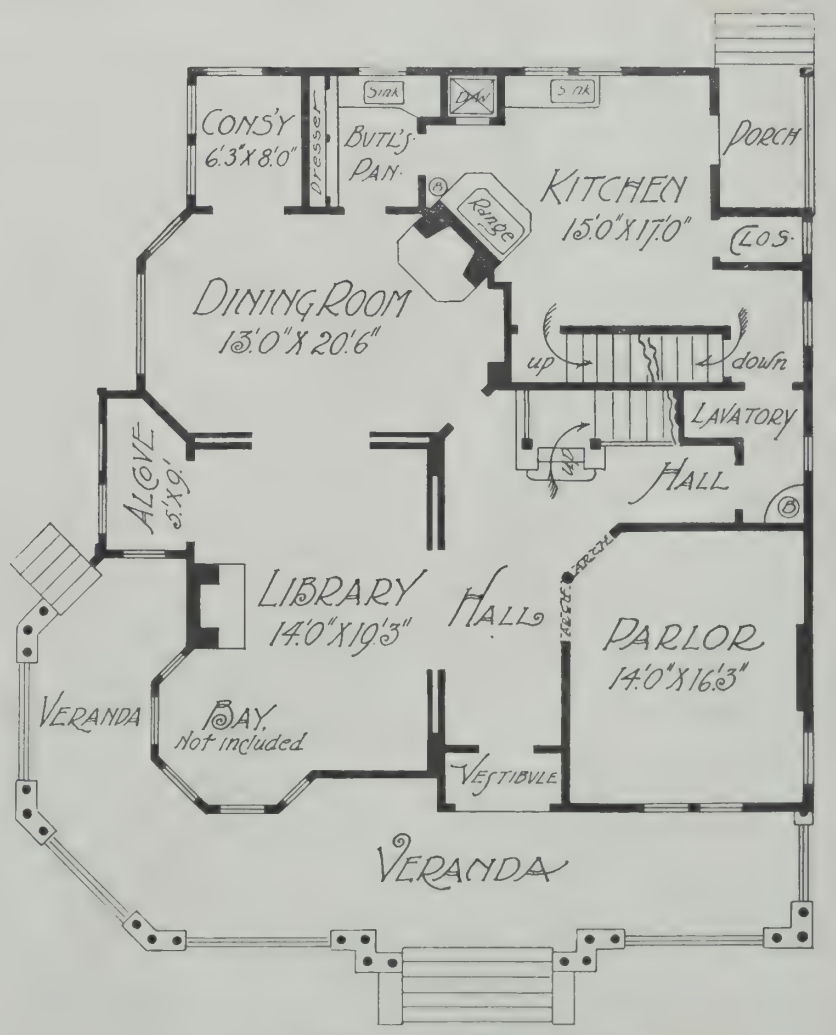


·SECOND·FLOOR·PLAN·



·FIRST·FLOOR·PLAN·

A RESIDENCE AT BENSONHURST, LONG ISLAND.—See page 83.

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THE NEW CITY HALL, PHILADELPHIA, PA.—See page 82.

A COTTAGE AT OAKWOOD, STATEN ISLAND.—See page 83.

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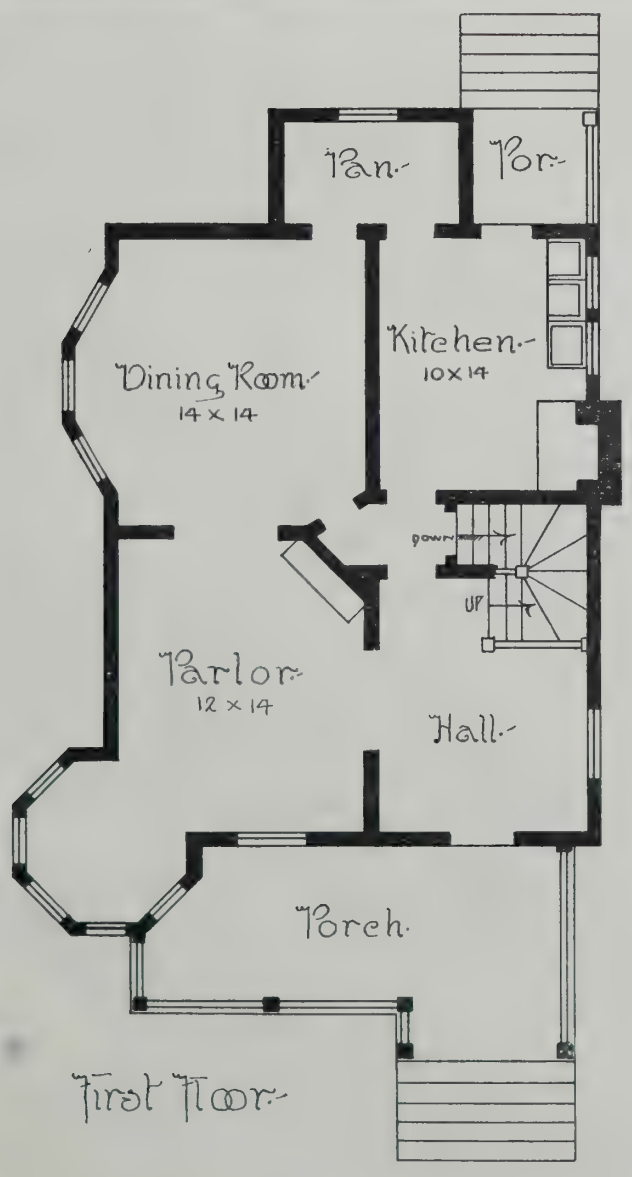

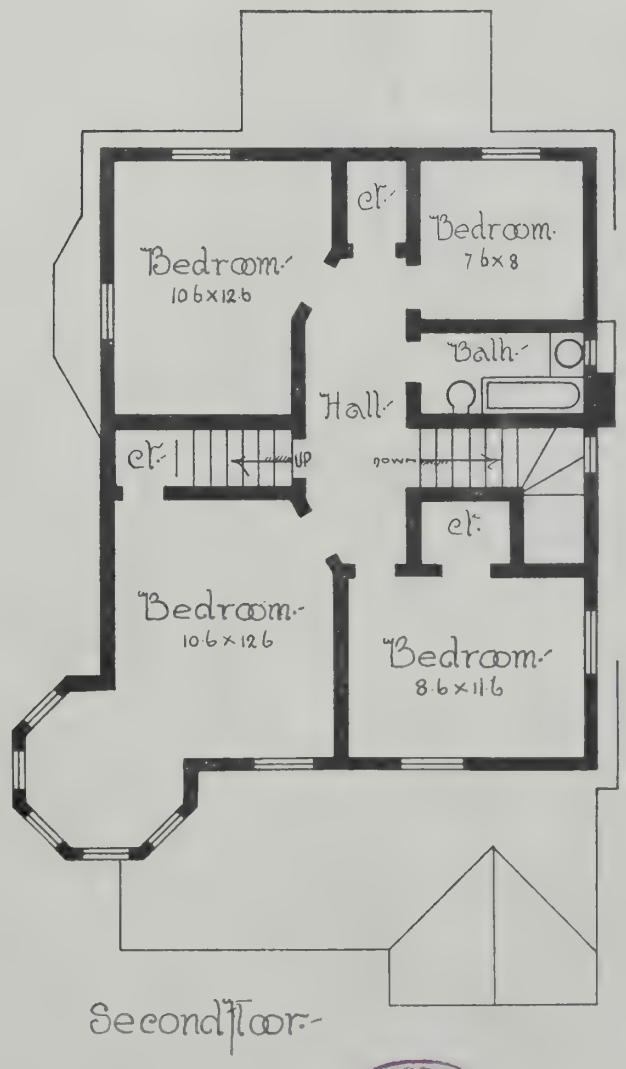

A COTTAGE AT OAKWOOD, STATEN ISLAND.—See page 83.

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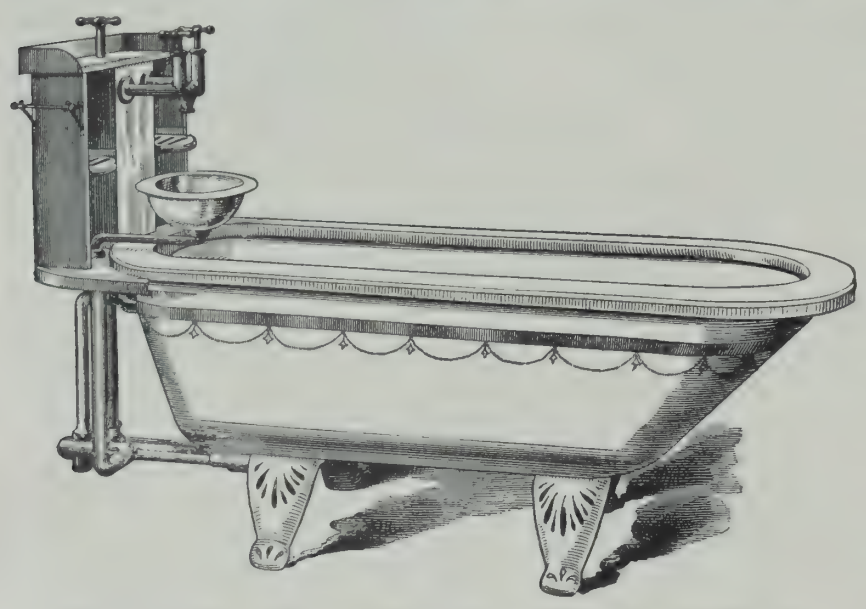
A COMBINATION BATHTUB AND WASHSTAND.

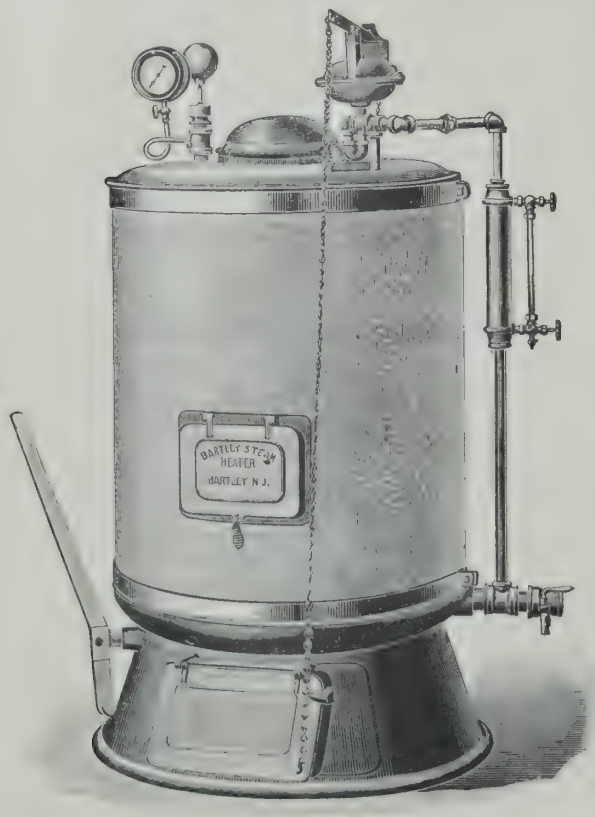
This improvement comprises a swinging wash-basin, with mantel, soap and brush shelves, and towel holder, in combination with the bathtub. Its manufacturers are the Stuart & Peterson Company, of Broad and Tatham streets, Burlington, N. J. The bathtub can be filled either from the mixing-cocks over the basin, or from the bottom, and the basin is emptied, not through the bathtub, but by a connection with the waste-pipe, outside of the end of the tub. In small bathrooms, where lack of room will not admit of a stationary washstand, this improvement is designed to be a great convenience.



THE "GOLDEN CROWN" COMBINATION BATHTUB AND WASHSTAND.

AN IMPROVED STEAM AND HOT WATER HEATER.

The illustration represents a boiler possessing easy steaming qualities, well made, and designed to be operated with great economy of fuel. It is manufactured by William Bartley & Sons, Bartley, N. J. The boiler is sectional, and can be disconnected without injury to any part. It has a circular fire pot entirely surrounded by water, and all the surfaces are vertical and practical self-cleaning. All the waterways are vertical, and the circulation is free and unimpeded. All annoyance and expense from leakage of joints is obviated. It has division plates for carrying heat down and around the bottom of boiler, and the anti-clinker grate cleans the fire perfectly. The boiler is cast of a special grade of strong iron, subjected to hydrostatic test under high pressure, and is guaranteed perfectly safe under all conditions. The casing, or jacket, is of galvanized iron, lined with asbestos board, preventing radiation of heat into the cellar.



THE "ACME" STEAM AND WATER HEATER.

ROOFING SLATES.—The Slatington-Bangor Slate Syndicate, of Slatington, Pa., in their Manual and Price List for this year, give some interesting and important facts for the consideration of every builder. Particulars are given as to the kinds of slate from many different quarries, hints on roofing, details about shipping, etc. The Syndicate recently made a shipment of twenty-four car loads of slate, in one solid train, through to St. Louis.

Moving a Large Factory.

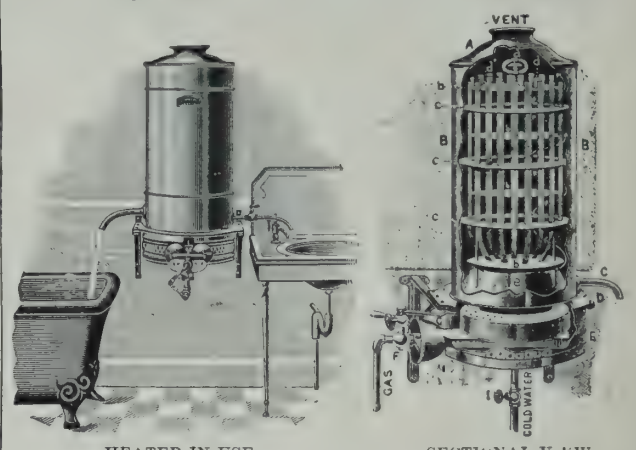
In the work of track elevation on the Providence division of the New York, New Haven and Hartford, it became necessary to move one of the largest factory buildings of the Sturtevant Blower Works, at Jamaica Plain. This building is 50×350 feet, about half the length of which has three and the other half two stories. The three-story portion was moved about 50 feet east and 300 feet south, and the other portion was moved 50 feet east from its former location. The work in the three-story section, except upon the lower floor, was carried on all of the time during the removal, power being supplied by a 20-horse power electric motor, belted from the second floor of the building to the main line of shafting. Provision was made for moving the motor away from the generator, which was situated in the engine room, by placing a reel containing the conducting wire upon the floor of the moving building, which allowed the wire to unwind, and made it possible to keep the motor running while the building was upon the rollers. The moving was carried out in the usual way, by means of capstans worked by horse power, which were connected to the building by ropes and blocks. The building was thoroughly tied in both directions by heavy iron rods before the moving was commenced, and though the walls of the first story are 20 inches thick, and of the second story 16 inches thick, the work was done without injury to the structure, in spite of the fact that the latter part of the journey was over filled ground.—*The Boston Herald.*

How to Fix Paper on Drawing Boards.

Take a sheet of drawing paper and damp it on the back with a wet sponge and clean water. While the paper is expanding, take a spoonful of wheat flour, mix with a little cold water, and make it a moderately thick paste; spread the paste round the edge of the drawing paper one inch wide with a feather, then turn the drawing paper over and press the edges down on the board. After this take four straight pieces of deal wood, ¾ inch by 2¼ inches wide; place them on the edge of the drawing paper, and put a large book or heavy weight on each corner to make the paper adhere firmly to the board. In about an hour's time the paper will be straight and even, and quite ready for executing a drawing. When the drawing is finished, take a sharp knife and raise one corner of the paper, then take a scale, run it round the edges, and the paper will come off easily. Turn it over and take the dry paste off with a knife, and all will be perfectly clean and no paper will be wasted.

A QUICK WATER HEATER.

The engravings show a new bath heater of exceptional merit. Fig. 1 is a general view of a No. 2 heater, with connections for supplying bath and basin. This heater is only 12 inches in diameter, and 27 inches high over all, and is guaranteed by the manufacturers to heat two and one-half gallons of water per minute, suitable for bath. Fig. 2 shows a broken view of the heater, and will aid the reader in understanding the principle of its construction and operation, which is as follows: The water enters through supply pipe, I, passes up to an improved revolving spray, marked A, in the top, which distributes the water in thin sprays to the upper plate, *b*, and to the copper strips, *d* and *d*, and to the inside of copper shell, B. The water passes down these strips and over plates, *b*, and rings, *c*, in a thin stream. The heat, which is derived from an improved atmospheric gas burner, composed of a double mixer and two annular distributers, after heating the converging walls of the cone, *e*, in the bottom of shell, passes out between bottom plate, B, and top of cone, *e*, and is caused to radiate in and out between rings, *c*, and plates, *b*, coming in contact with the water passing down the strips. The heating water lands on lower plate, *b*, the hottest part last, from whence it drops on to cone, *e*, and emerges very hot at the outlet spout at the side. These heaters are now fitted with a duplex gas cock and water valve, as shown in Fig. 1, which makes it impossible to turn on the gas while the water is off. This makes it impossible to burn out or in any way damage the heater by neglecting or forgetting to turn out the gas when through using. The makers claim for this heater that it is strictly up to date, small, and for efficiency is unexcelled by anything of the kind on the market. The manufacturers are the Horix Manufacturing Company, 970 and 972 Hamilton Street, Cleveland, Ohio.

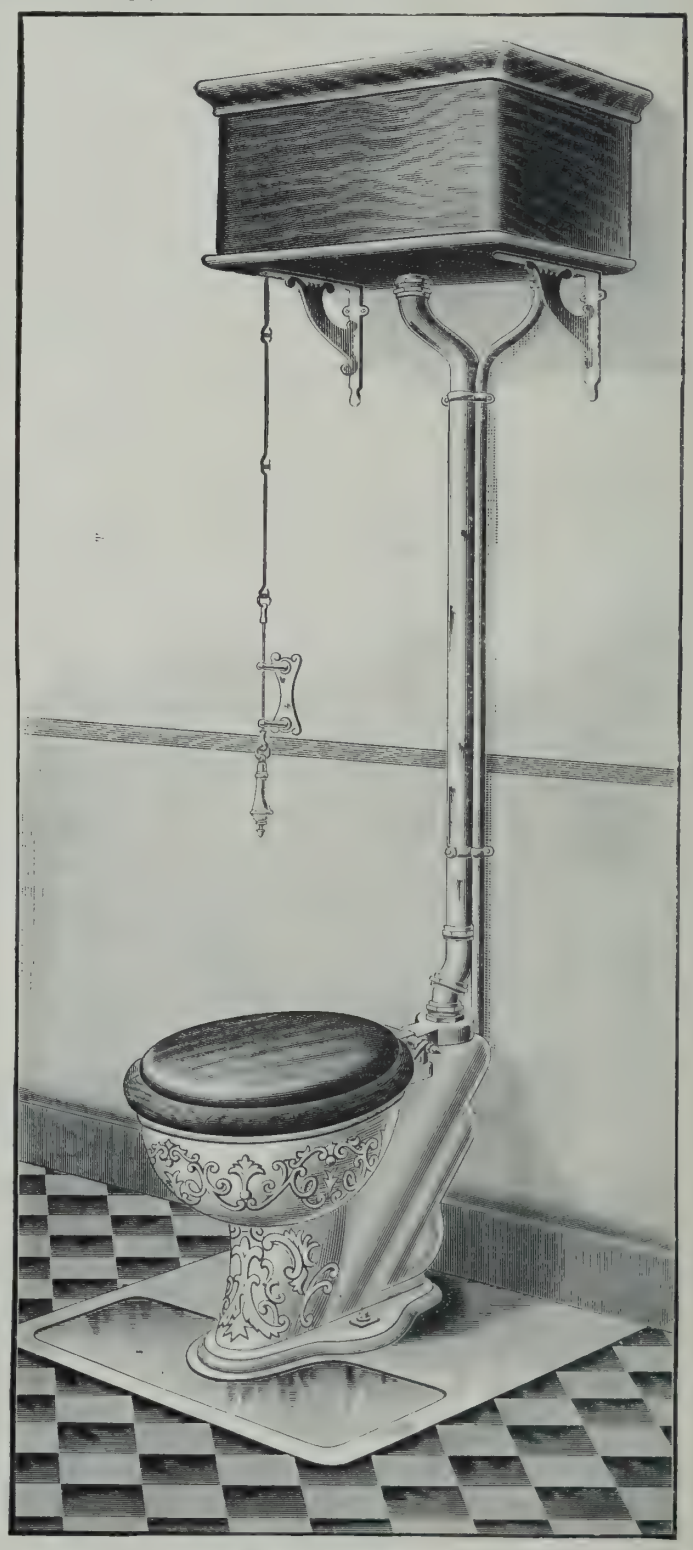


HEATER IN USE. SECTIONAL VIEW.

THE "LIGHTNING" WATER HEATER.

IMPROVED TOILET-ROOM FIXTURES.

The Triton outfit for toilet rooms, shown in the accompanying illustration, consists of a siphon jet closet of the most modern design, ivory tinted, and beautifully embossed. It has a perfect working jet, with top supply, thus giving a large and rapid flush of water by emptying into the bowl direct, rather than with bent coupling. The tank furnished with this closet is a piano polish, round cornered, veneered box, lined with 10-ounce plain copper, with simple trimmings, a silent overflow ball cock, nickelplated cast brass brackets, and nickel guide pull. These improved fixtures are made by the Haydenville Manufacturing Company, 75 Beekman Street, New York.



THE "TRITON" WATER CLOSET OUTFIT.

A SINGLE TRACK PARLOR DOOR HANGER.

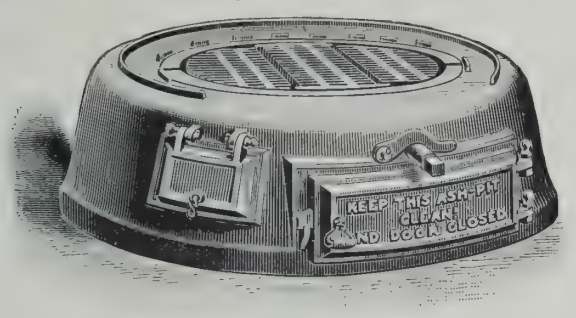
E. C. Stearns & Co., of Syracuse, N. Y., have recently introduced a new parlor door hanger, shown in the illustration, which is designed to be a model of simplicity in the construction of hanger and rail, and in the method of putting up. The wheels run on a single steel track, secured to one partition, and are thus not subject to derangement from unequal settling of partitions. The centre of the wheels of this hanger is made of vulcanized fibre, the edge of which forms a rolling surface. This fibre centre forms a solid disk extending to the axle, and is firmly held between plates by means of rivets

THE STEARNS PARLOR DOOR HANGER.

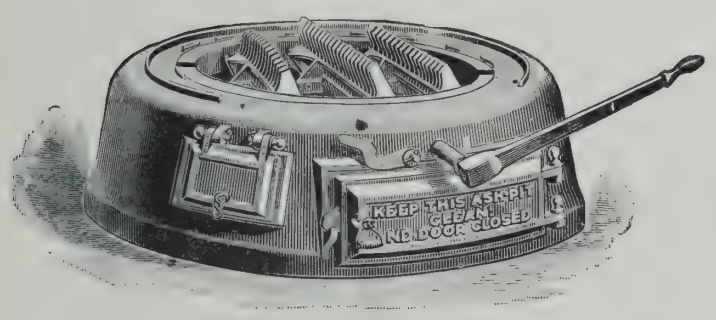
passing through both plates as well as through the fibre. The axle is made of steel, and the bearings are turned perfectly true, making it practically noiseless. Each hanger may be adjusted independent of the other by the use of a screw driver and without the derangement of any part.

AN IMPROVED FURNACE GRATE.

The illustrations represent, in two positions, a recently introduced grate, perfected by and now applied to all the heaters manufactured by the Nason Manufacturing Company, of No. 71 Beekman Street, New York. The grate is designed to render more easy the perfect control and easy management of the fire. It will be noticed that each bar is formed with two lateral stays running its whole length to the trunnions, instead of one, as is commonly used. Across the stays are ties with short pieces or



GRATE SET, READY FOR USE.



POSITION OF GRATE IN DUMPING.

THE NASON 1895 GRATE.

fingers extending on both sides. This method of construction gives greater stability, with less weight, than with any other form, and also largely increases air space, insuring both better combustion and cooler bars, with their consequent longer life.

Cements in Mason Work.

A representative of the Brickbuilder, in an interview with Mr. William Peck, of the H. Wales Lines Company, Meriden, Conn., an authority on mason construction, obtained the following information:

"Do you favor the first or second setting of cements for mason work?" asked the interviewer.

"That depends," answered Mr. Peck, "upon the work I have in hand. Generally, however, I prefer the second setting. The truth is that masons very seldom use the first or even second setting of cement, but, owing to their ignorance of the action of cement, generally use it in its third setting. Laborers usually mix up a bedful at a time, and temper it as it is used, sometimes once. very often twice; thus by the time it gets into the wall it is in its second or third setting.

"For sidewalks or cement floors I prefer the first setting, as it works better and does not become so spongy under the trowel."

"What do you consider the best mode of putting down cement floors?"

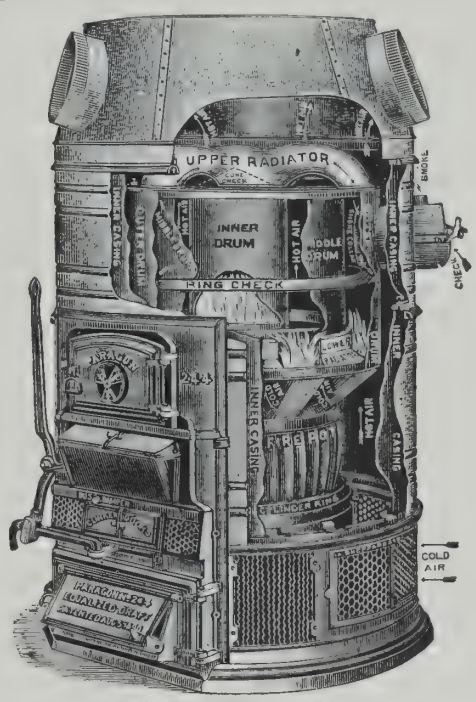
"I think the best manner to do a good job is, first, to have the ground underneath well tamped down and solid; second, to use screens instead of strips to get the proper thickness of cement; third, to have help enough to keep putting down all the time and not have to wait between batches, thereby causing a break or joint between the settings, which is liable to make a crack; fourth, to float the first coat or layer as little as possible, thereby preventing the rising of the sand to the top of the cement, and insuring a good bond between the rough coat and finish."

"What is one of the common errors of contractors?"

"One great mistake they make is in not keeping their walls properly covered during construction, especially in the winter. A few dollars expended for tar paper or canvas and the time required to cover them will often prevent hundreds of dollars' worth of damage by elements, and will not leave a dark streak there when construction is continued."

AN IMPROVED FURNACE.

The accompanying cut shows this style of furnace with sheet steel radiator. It is also made with cast iron radiator, if desired. The principal features of the Paragon are the equalized draught obtained by the connection of the

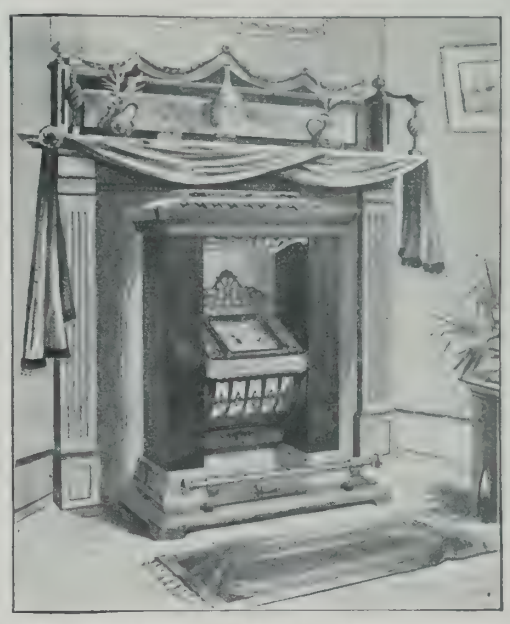


THE "PARAGON" FURNACE.

inner and outer drums at the top and bottom of radiator, insuring thereby an even distribution of heat over all the radiating surfaces, also insuring the thorough self-cleaning of the radiators. The Paragon is made in the following sizes, 28, 33, 36, 40, 44, and 48 inch, and is made with either sheet steel radiator or with cast iron radiator, the former being generally preferred for hard coal, and the latter for bituminous coal. These furnaces are also made in the brick-set form, and with a hot water heating device which enables the combination hot air and hot water system to be introduced. The combination system of heating is one that is gaining in popularity. These furnaces are made by I. A. Shepard & Co., 1801 North Fourth street, Philadelphia, Pa.

A REGENERATIVE GAS HEATER.

The illustration represents a highly efficient form of gas heater, burning with freedom from smoke and smell, and which heats both air and gas before combustion, therefore giving high flame temperature and maximum economy. The heat is radiated to the floor, where it is

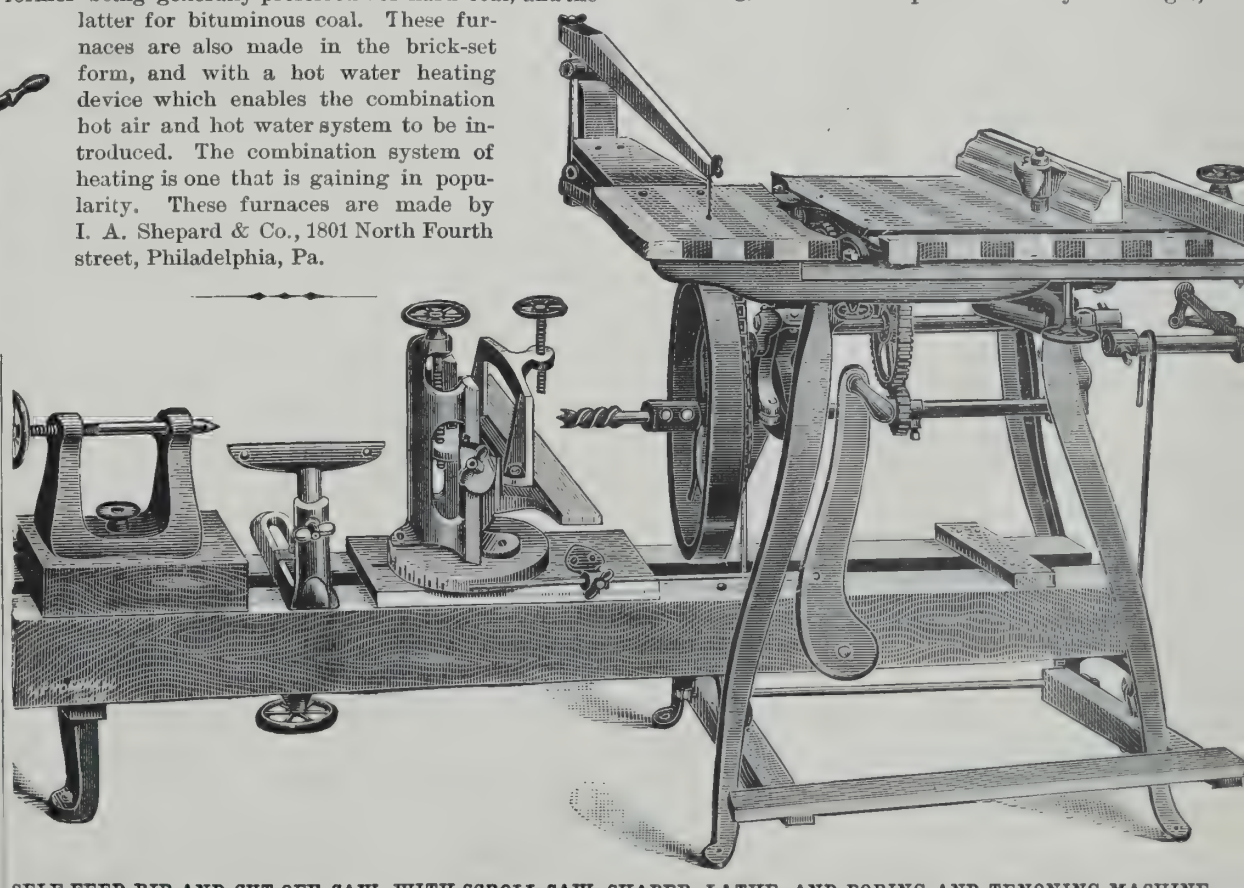


THE "TRIUMPH" REGENERATIVE GAS HEATER.

most needed, and the supply of gas is volumetrically regulated according to the temperature desired. The group governor, by which such regulation is effected, is one of the patented improvements of Moses G. Wilder, who has attained a national reputation for the successful working of devices he has introduced for the control, regulation, and economical burning of gas. The "Triumph" heater is manufactured by the Wilder Manufacturing Company, of 816 to 822 Cherry Street, Philadelphia, Pa., and another valuable feature of its construction is a very effective arrangement for circulating through the heater a large quantity of cool air, taken from near the floor, and distributing the entire heat of the gas consumed by means of the circulating air, thus equalizing the temperature of the room fully. It is adapted by its size and capacity of its burners, for heating parlors, sitting-rooms, and offices, while its finish and the beauty of its design are calculated to satisfy the most refined and artistic taste.

IMPROVED WOODWORKING MACHINERY.

The illustration represents a combination of several machines as one, to be operated by foot or hand power. In operating the machine the right hand and left foot may be advantageously used at the same time, the hand going down as the treadle goes up. For ripping and cross-cutting, the machine possesses many advantages,



SELF-FEED RIP AND CUT-OFF SAW, WITH SCROLL SAW, SHAPER, LATHE, AND BORING AND TENONING MACHINE.

especially in its feed, and the scroll saw and shaper are very powerful. A special shaper cutter head is made, with knives turned and sharpened to cut in either direction. A lathe and boring attachment forms a part of the machine, and also a tenoning device, by means of which wagon wheels may be pointed and tenoned nicely. This machine, with other hand and foot power tools of standard excellence, is manufactured by L. F. Parks, 206 Colerain avenue, Cincinnati, Ohio.

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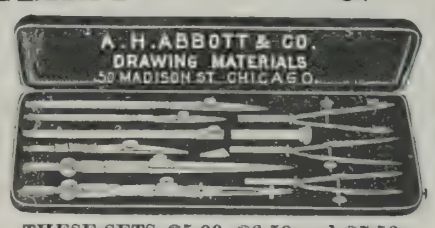

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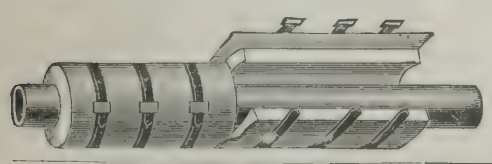

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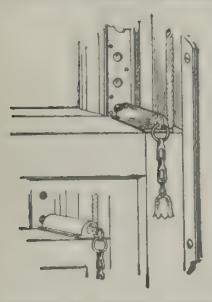

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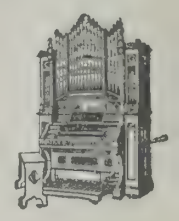

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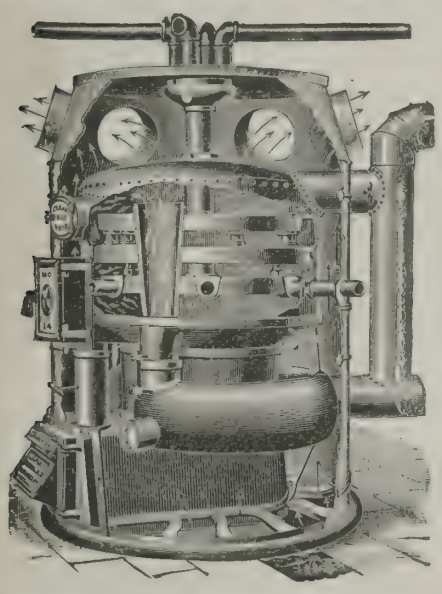

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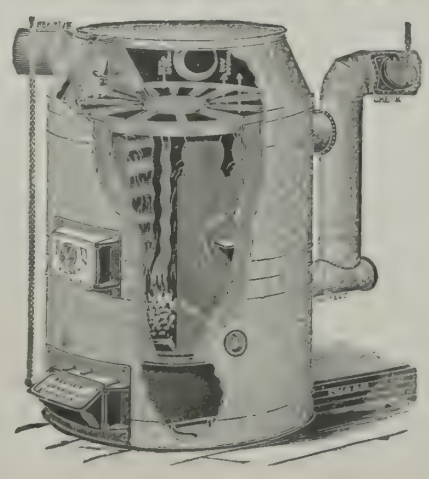

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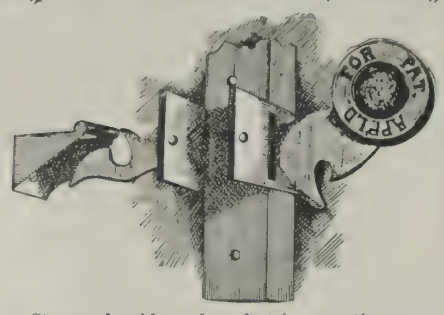

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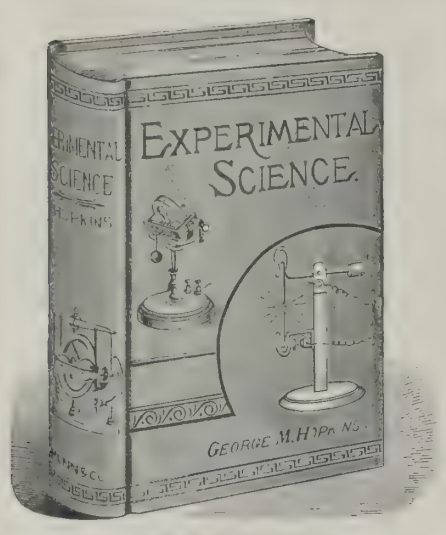

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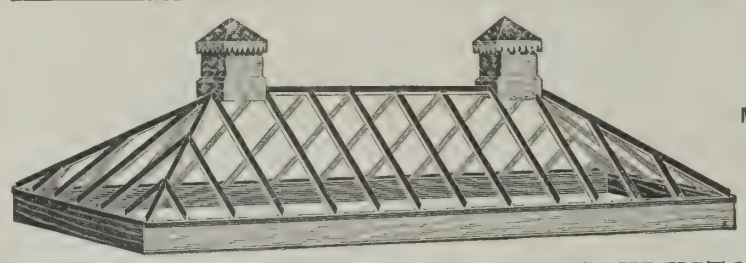

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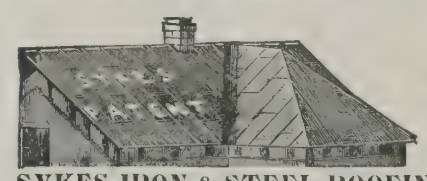

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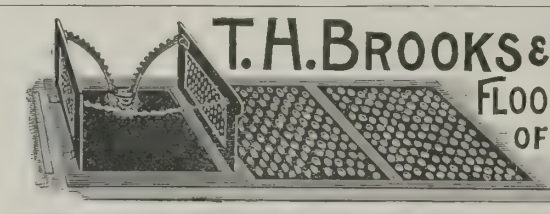

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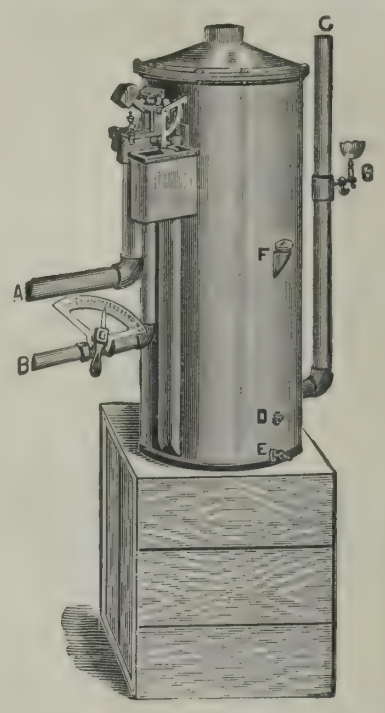

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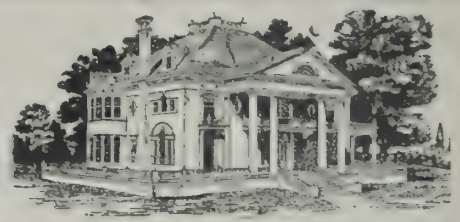

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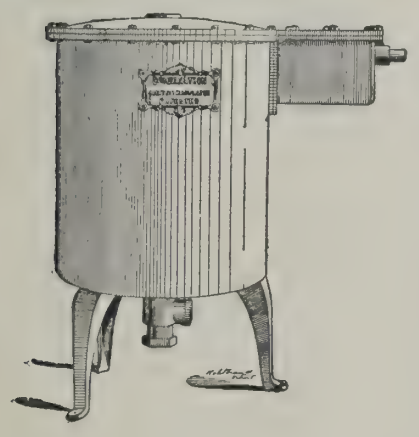

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(1) J. M. says: I have a building 10 feet by 12 feet; it is sided outside and ceiled inside, and has a floor in it; can I keep ice in it by using plenty of sawdust, or will I have to take the floor out? A. The floor should be taken out and a good drain made; outside of house should be banked up with earth as much as possible to prevent circulation of air, and with a foot of sawdust all around the sides, and 2 feet on top of the ice, you will make a fair ice house. 2. What kind of starch do the Chinamen use, or do they use anything else to get the fine gloss on linen goods? A. The Chinese use ordinary starch, with a weak solution of borax and gum Arabic.

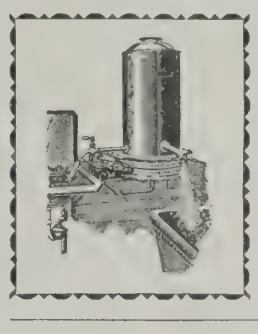
(2) F. W. F. asks if there is any way, and how, that you can tell how far a stream of water can be thrown through 50, 100, 200, or any number of feet of hose, when the hydrant pressure is given, the hose being 2½ inches, and the nozzle pipe 1⅛ inches diameter? A. The principles and rules for computing the distance and height of fire streams, and the friction in fire hose for various pressures and velocities, are explained and illustrated in SCI. AM. SUP. No. 792, 10 cents mailed.

(3) H. E. H. asks how to estimate the force of a blow made by a steam hammer, when the end of piston serves as the hammer; also, would there be much diminution of the force of the blow, if transmitted through another piece of metal held tightly against the object to be hammered? Is there any way by which the force of a blow from a hammer actuated by a spring can be determined? A. The force of a blow in a steam hammer, and other forces, are explained, and the method of computation carried out, with examples, in SCIENTIFIC AMERICAN SUPPLEMENT, No. 862. There will be a considerable diminution of the force in transmitting a blow through another body, depending upon its weight and rigidity. Cast steel, when hardened, is the most rigid of the metals for transmitting a blow. The force of a blow from a hammer, actuated by a spring, may be known by the method of computation for a steam hammer; the weight and the actual pressure of the spring, with the acquired velocity, being the elements for computation, as shown in the article on "Impact, or the Force of Percussion," in the SCIENTIFIC AMERICAN SUPPLEMENT as above named.

(4) G. M. asks for a rule used for calculating the contents of a barrel. A. To find the volume of a cask of any form: Add together 39 times the square of the bung diameter, 25 times the square of the head diameter, and 26 times the product of the diameters. Multiply the sum by the length, and divide by 26,470 for United States gallons.

(5) H. B. C. asks how to destroy aphides. A. To destroy common plant lice (Aphides) and other insects in the greenhouse and garden, the following remedy has been recommended by M. Cloetz, of the Jardin des Plantes, in Paris: 3½ ounces quassia chips, 5 drachms of stavesacre seeds, powdered and placed in 7 pints of water, and boiled until reduced to 5 pints. Dr. Hull recommends dusting slaked lime on the trees or bushes when the foliage is wet; syringing with soapsuds or tobacco water, or a strong decoction of quassia with soapsuds; also a weak solution of chloride of lime is said by Mr. Andrews to preserve plants from insects, if sprinkled over them. The following recipe is also highly recommended in an English horticultural journal as being almost infallible for mildew, scale, mealy bug, red spider, and thrips: 2 ounces flour of sulphur worked

(*Continued on page* vi.)



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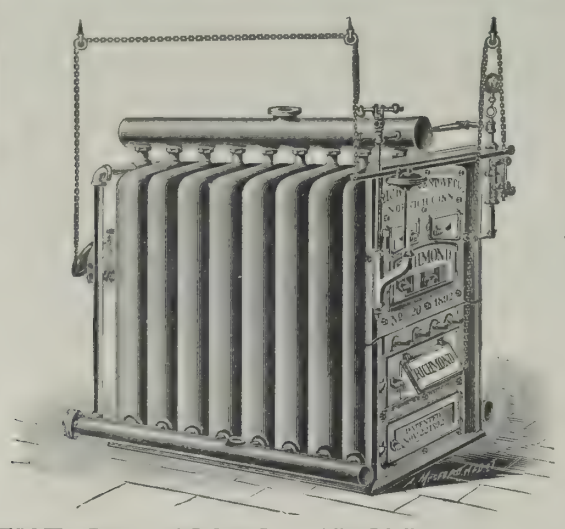

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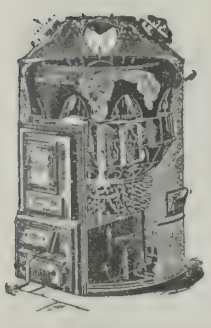

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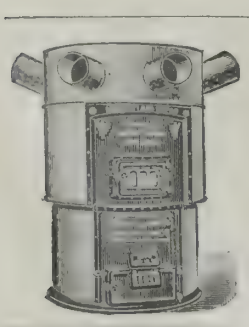

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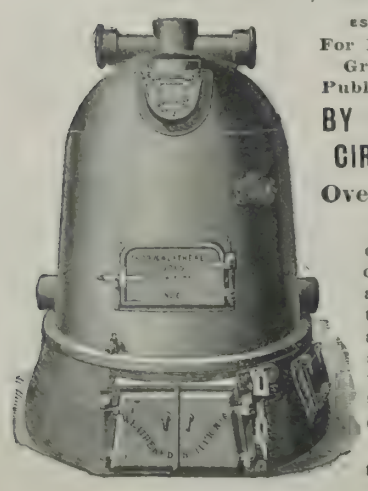

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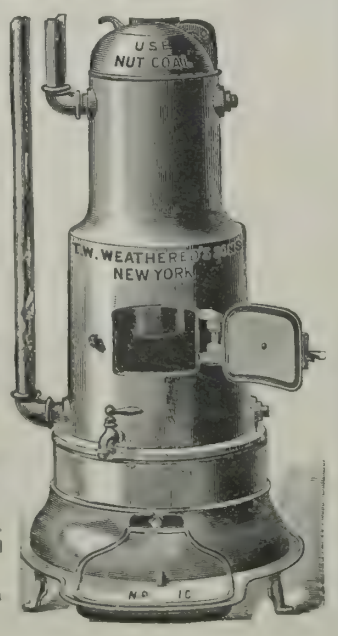

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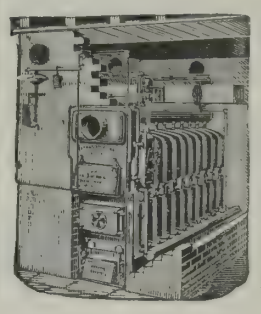

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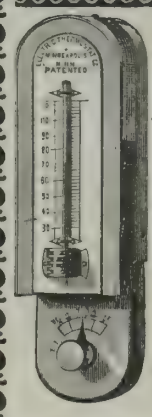

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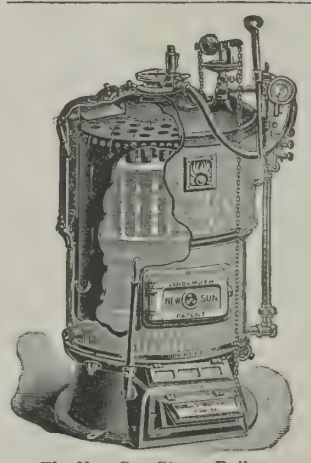

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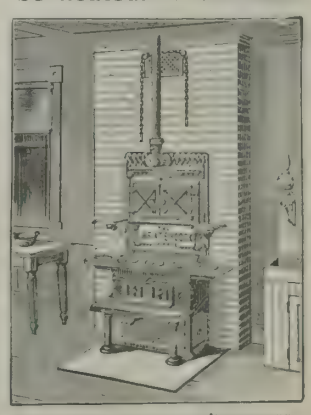

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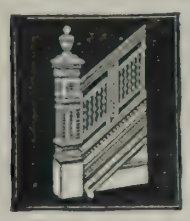

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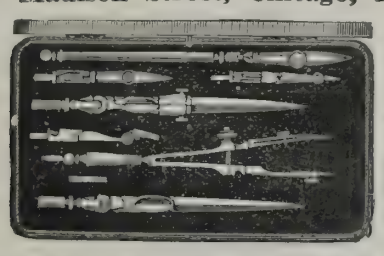

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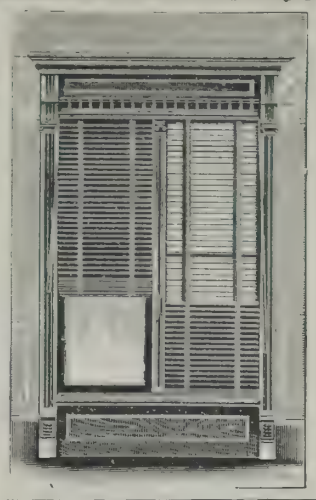

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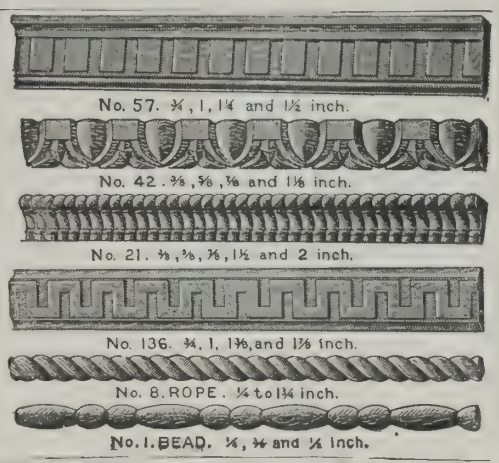
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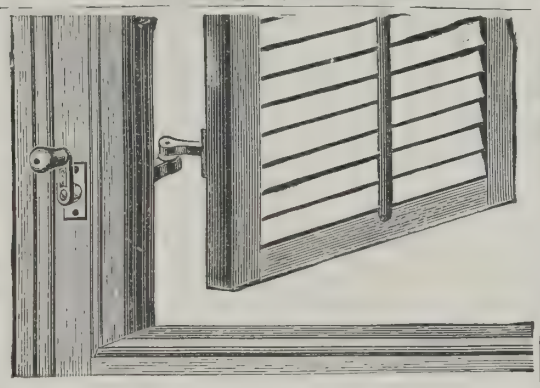

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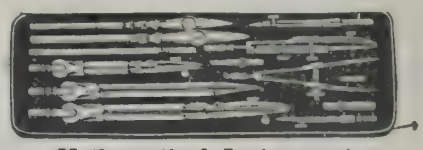

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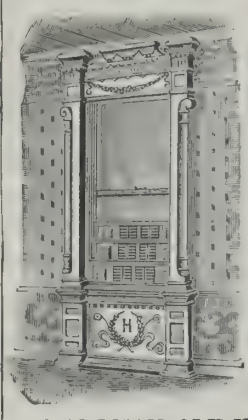

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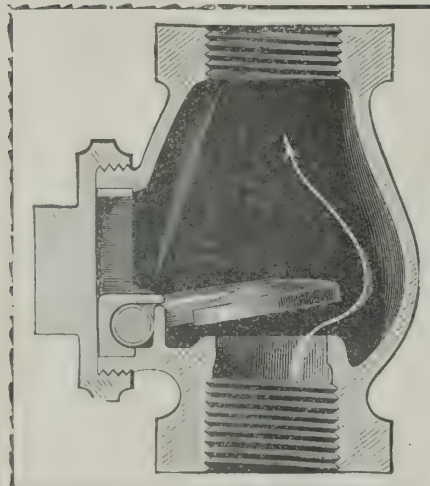
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(*Continued from page* iii.)

into a paste with water, 2 ounces washing soda, ½ ounce of common shag tobacco, and a piece of quicklime about the size of a duck's egg. Pour them all into a saucepan with 1 gallon of water, boil and stir for a quarter of an hour, and let the whole settle until it becomes cold and clear. It should then be poured off, leaving a sediment. In using it add water according to the strength or substance of the foliage. It will keep good for a long time if kept closed.

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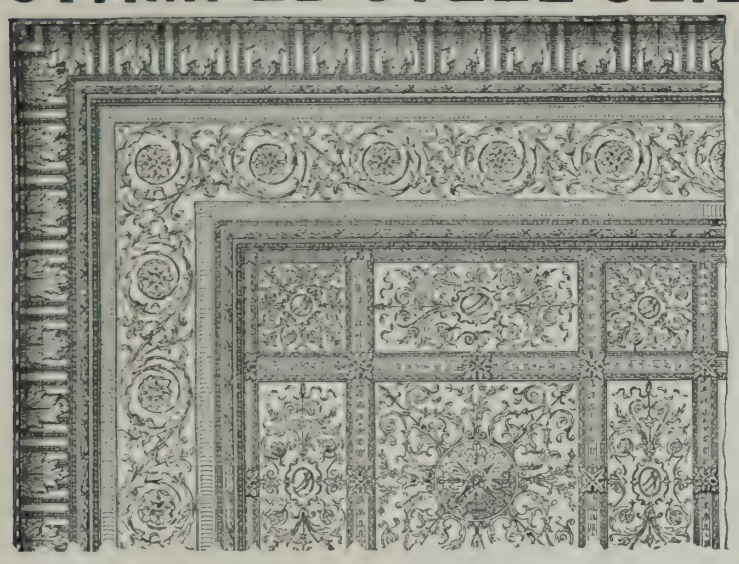

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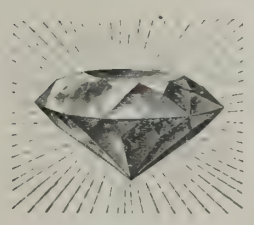

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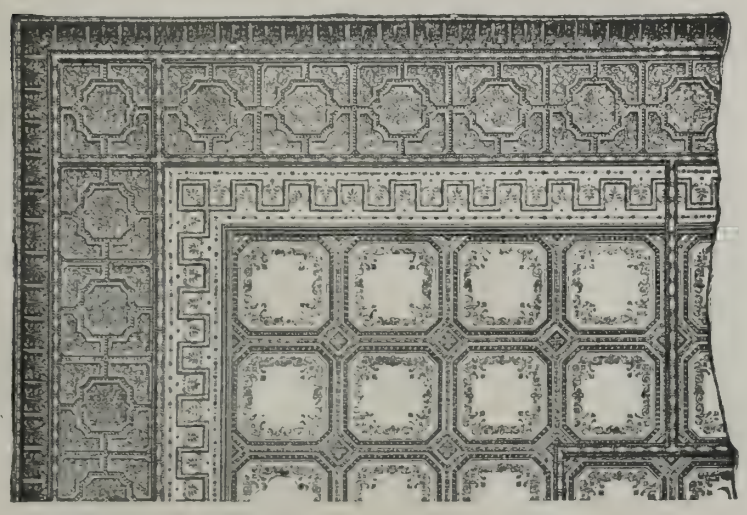

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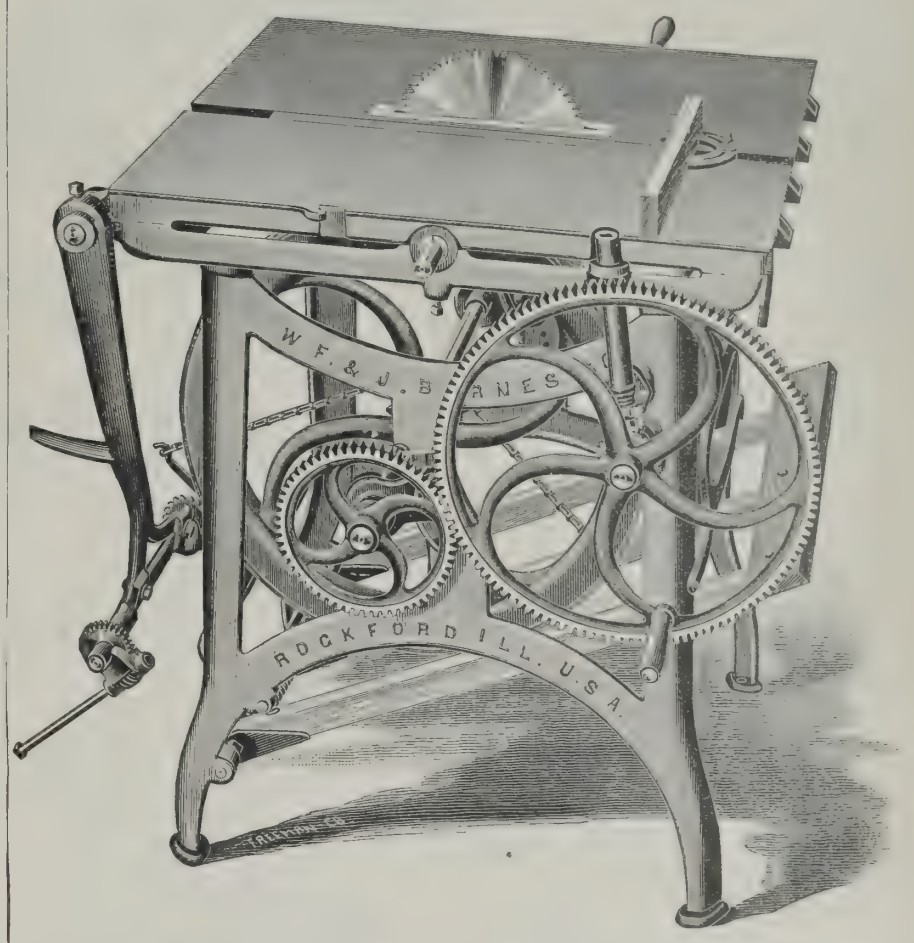

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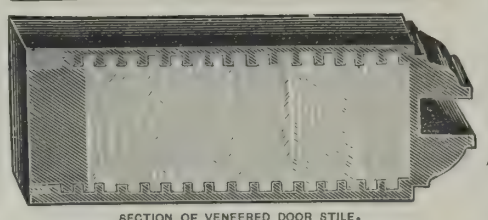

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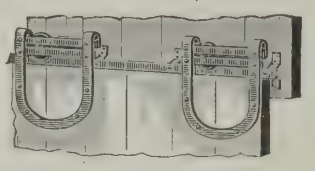

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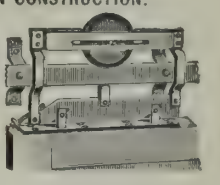

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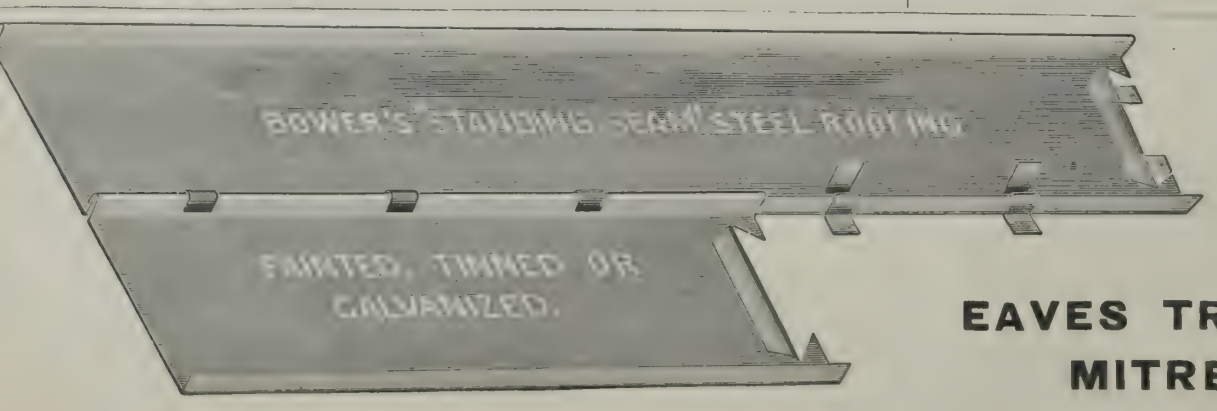

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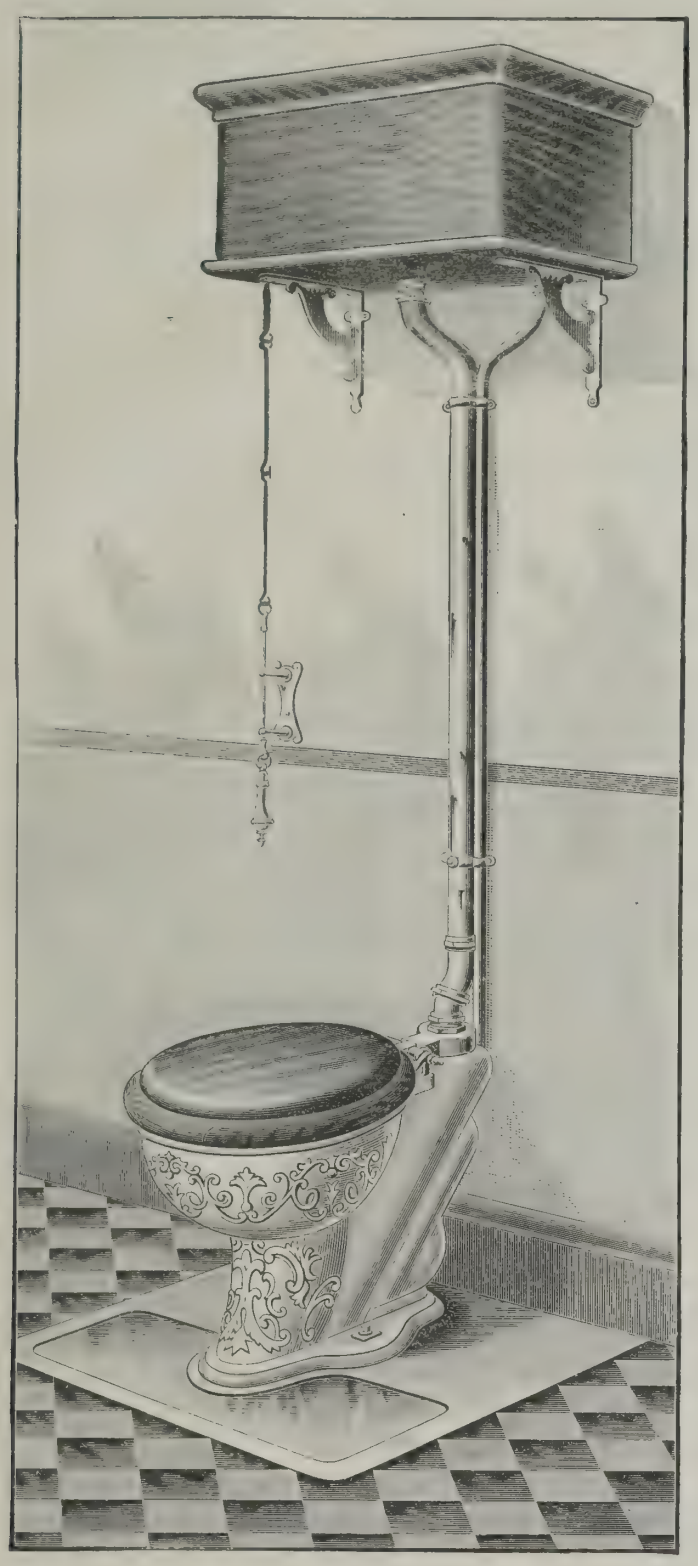

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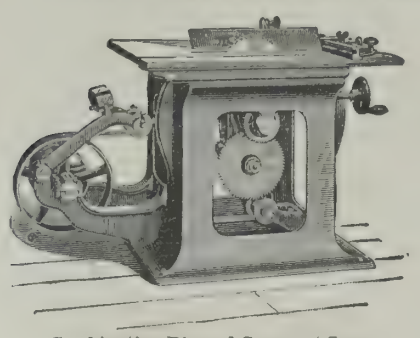

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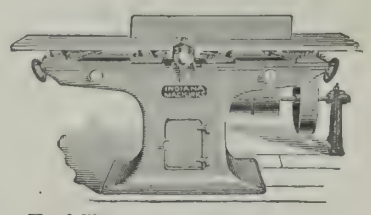

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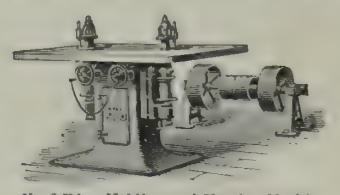

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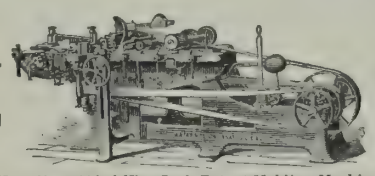

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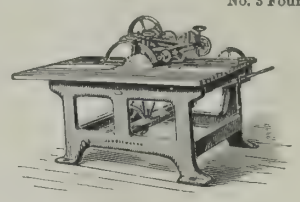

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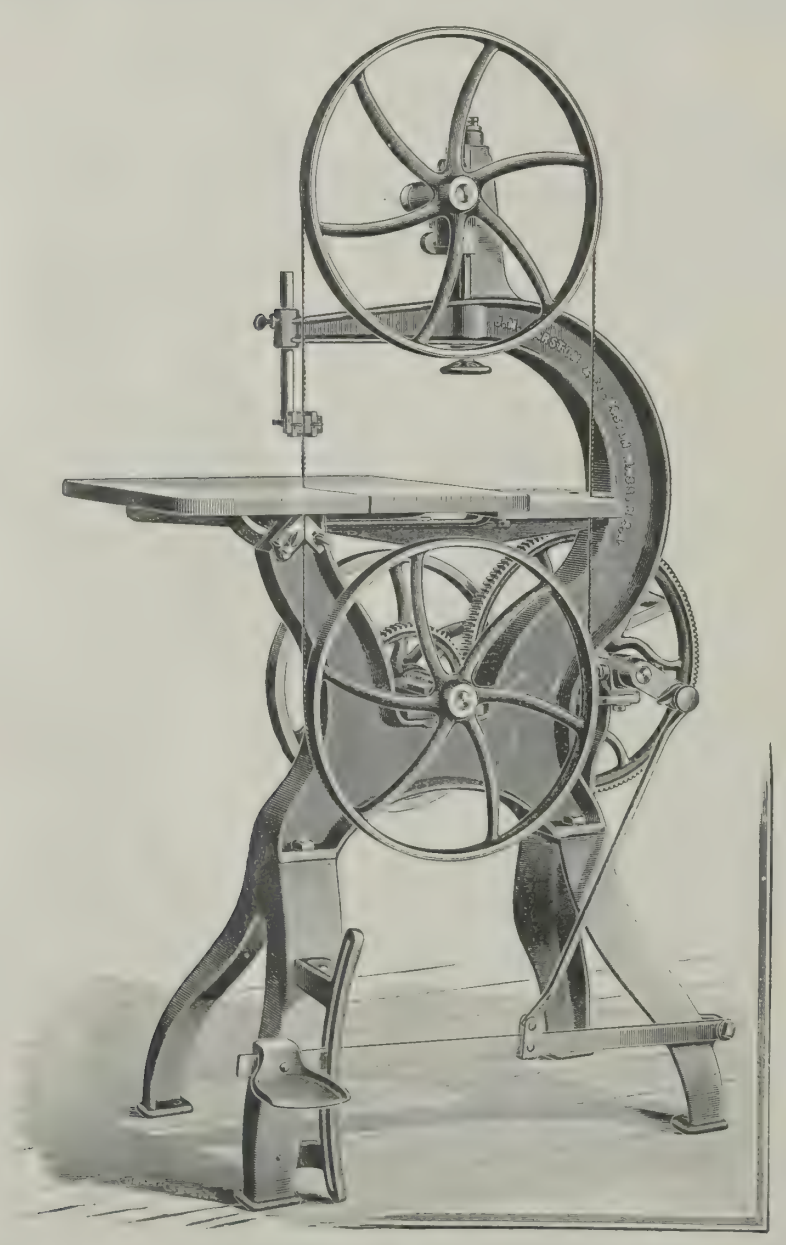

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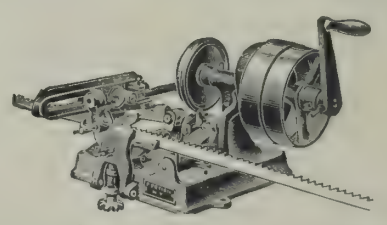

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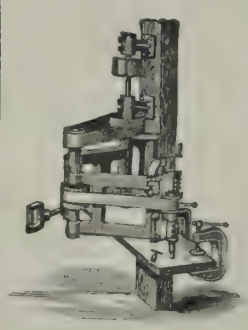

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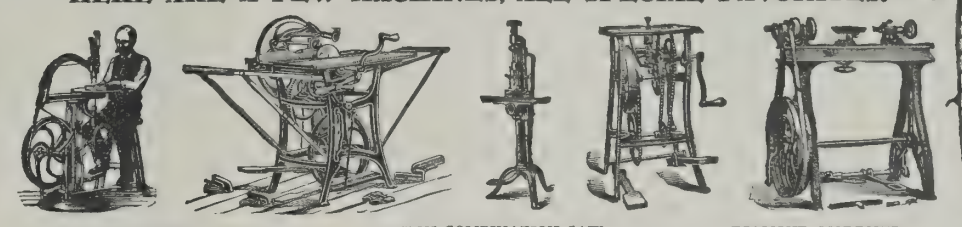

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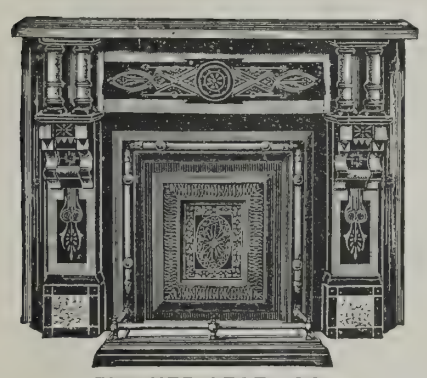

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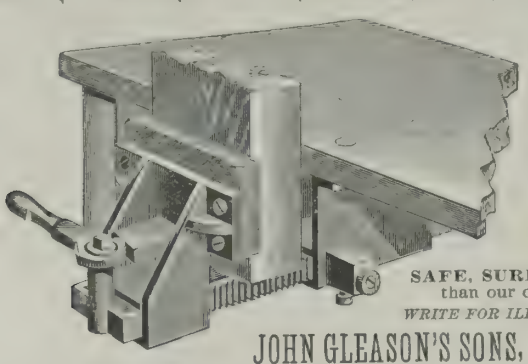

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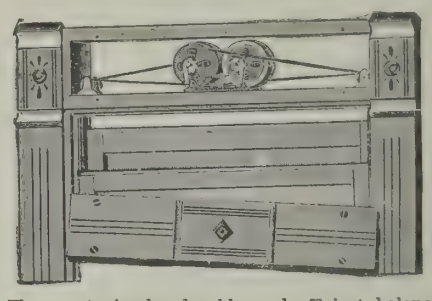

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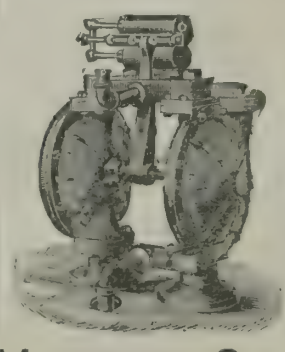

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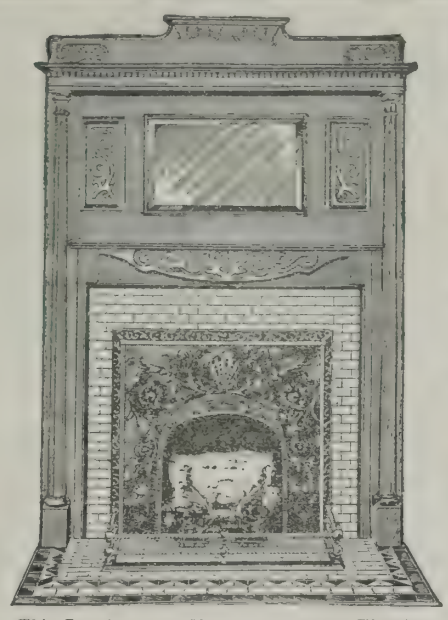

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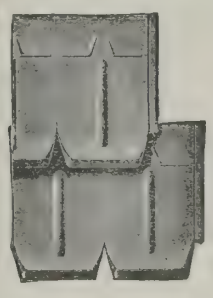

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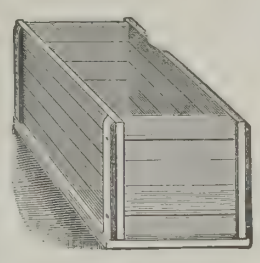

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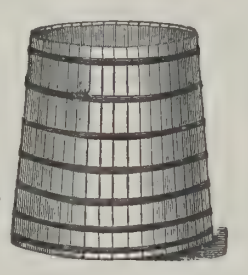

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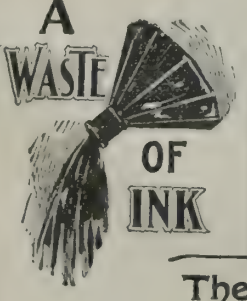

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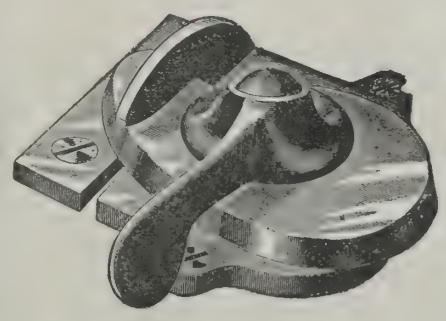

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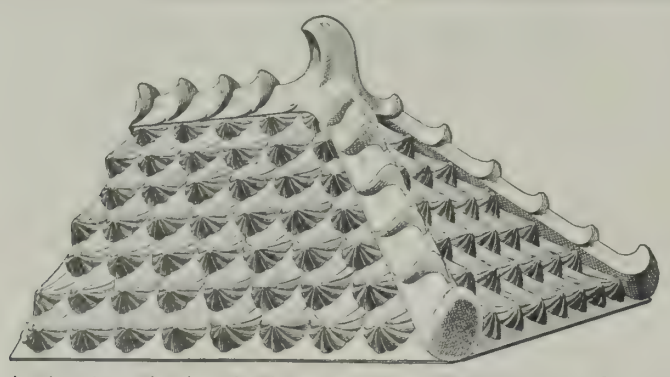

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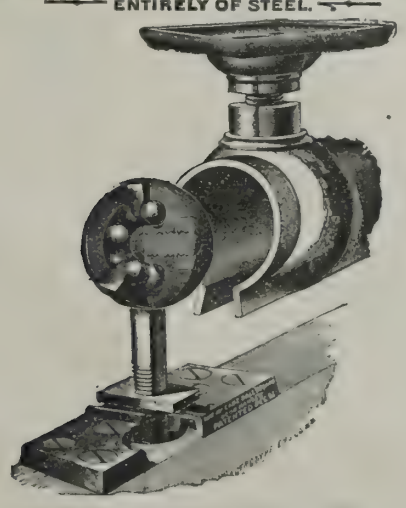

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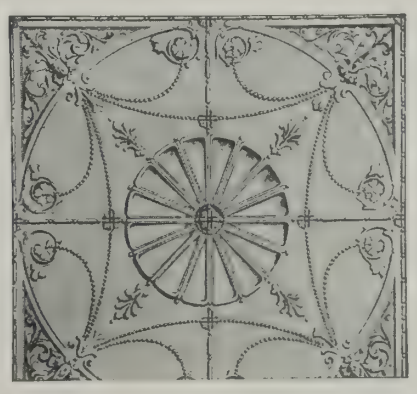

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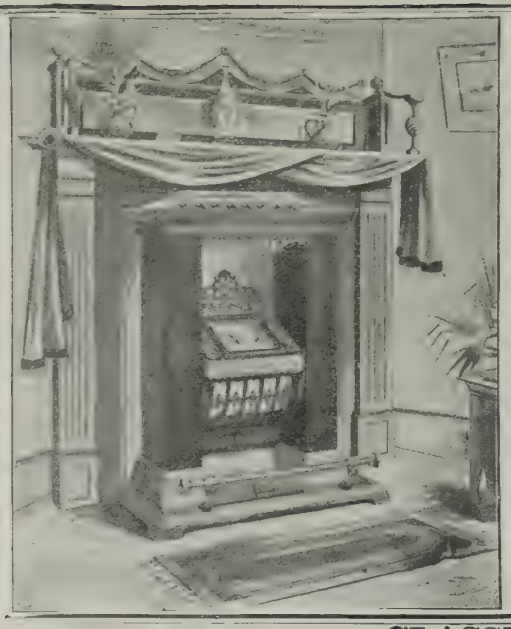

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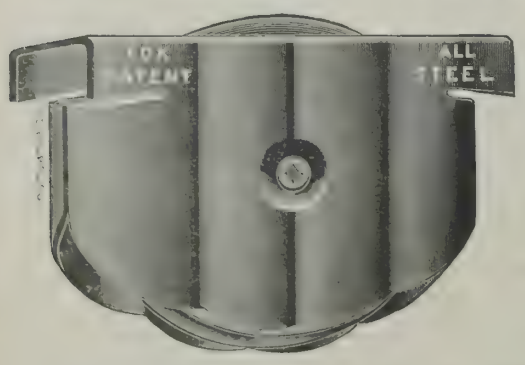
W. F. & J. Barnes Co xi
J. A. Fay & Egan Co x
Fox Machine Co xvi
Indiana Machine Works x
P. Pryibil x
Samuel J. Shimer & Sons xi
Seneca Falls Mfg. Co xi

Our Innate Modesty



is visibly jolted as we note the very extravagant claims most people make in advertisements. We do not claim that the use of the Fox pulley makes the presence of a foundation unnecessary under a building, or that the use of the Fox pulley is a sure preventive against moths and other "pestiferous birds." We calmly state that it is designed as the lightest, strongest and neatest **Sash Pulley,** and meets all the requirements. All steel in every part makes it strong, light and durable. Inserted without nails or screws. Samples free as the air you breathe.

FOX MACHINE CO., Hardware Department,

300 North Front Street, GRAND RAPIDS, MICH.

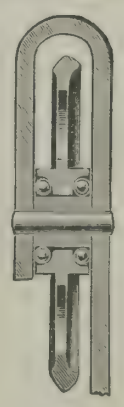
The "Great American"

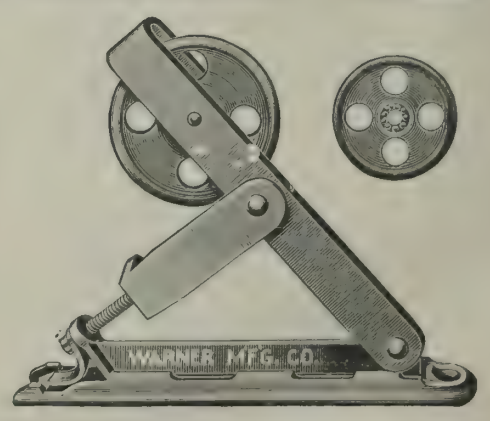
BALL BEARING,

Parlor Door Hanger.

STEEL SINGLE TRACK.

ALL STEEL.—NOISELESS.





PATENT APPLIED FOR.

The "GREAT AMERICAN" **Ball Bearing** is the only first-class improvement ever made in PARLOR DOOR HANGERS.

The Bearings are the same as used in HIGH GRADE BICYCLES, and are absolutely without friction.

The price is no higher than for the ordinary goods.

The simplicity and short time required in putting up are features possessed by no other Hanger now on the market. The self-locking feature of our new Hanger is beyond comparison.

While we consider our STEEL SINGLE TRACK HANGER far superior to our Double Track, we will continue the manufacture of the latter as long as there is any demand for them.

THE WARNER MANUFACTURING CO., Manufacturers, FREEPORT, ILLINOIS.

DEC=CO=RE=O.

PATENTED

SEPTEMBER 19, '93; JANUARY 16, '94.

For Grilles, Transoms, Window Heads, Stair Balustrades, and all decorative purposes, made in any design.

FOR SALE BY

ARCHITECTS, BUILDERS AND DECORATORS,

TO WHOM WE WILL SEND ILLUSTRATIONS AND CATALOGUES FREE.

Suggestions for Special Designs Solicited.

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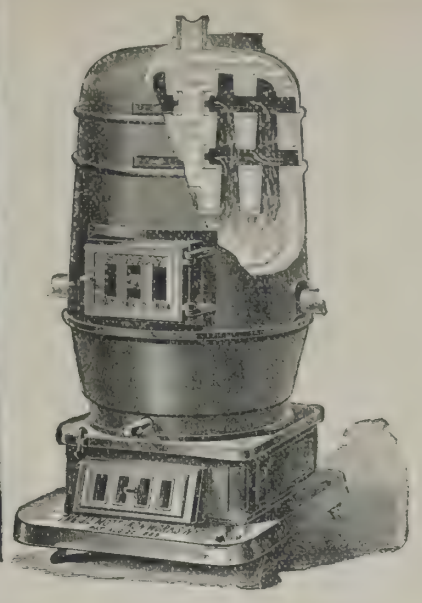
136-138 W. 23d Street, - - - - - - - - - New York.
14th and B Streets, - - - - - - - Washington, D. C.



311, 313 Wabash Avenue, Chicago, Ill.

A Man

Who wants to keep warm should write to us, and get our pamphlet on hot water and steam heating for homes. We make a specialty of heaters for small residences and greenhouses. Every heater is guaranteed to do all we claim for it.

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THE J. L. MOTT IRON WORKS,

84 to 90 Beekman Street, New York.

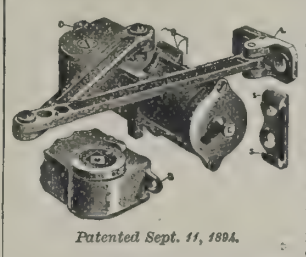
NEW YORK · CHICAGO · ST LOUIS · WHEELING

WHEELING CORRUGATING CO.

Patent Continuous Steel Ceilings Write for Catalogue

The Royal Door Check and Spring.

THE LATEST, CHEAPEST, BEST SIMPLE, COMPACT, STRONG, DURABLE.



Patented Sept. 11, 1894.

The **Royal** has a COMPRESSED AIR CHECK. No liquids to freeze up or leak. Doors open easily. No back suction. Easiest attachment. Does not require a skilled mechanic to put them on. Improved ratchet for increasing tension on spring. Will fit right or left hand doors.

Send for illustrated circular and price list.

W. H. QUINN & CO., 105 Chambers St., NEW YORK.

THE MATTHEWS DECORATIVE GLASS CO.,

Manufacturers of Ornamental Glass in Sheets, or from Special Designs, by the *SAND BLAST* and other *PATENTED PROCESSES.*

CHIPPED GLASS. EMBOSSED GLASS. LEADED GLASS.

***GOLD* and *SILVER* Embossed and Transparent Glass Signs. *MARBLEIZED* Glass for Ceilings. Advertising Novelties in Glass.**

Estimates furnished promptly on application.

328 & 330 EAST TWENTY-SIXTH STREET, NEW YORK.

STAINED GLASS & INTERIOR DECORATION

HIGH-CLASS * DECORATIONS

IN ALL STYLES.

For Modern Colonial Dwellings we have Wall Paper in every appropriate shade of color, Delft Blue and White, Yellow, Red, Green, etc.

LEADED, CLEAR AND TINTED GLASS.

Decorators Sent to all Parts of the Country.

H. F. MILES, 14 Monroe St., CHICAGO, ILL.

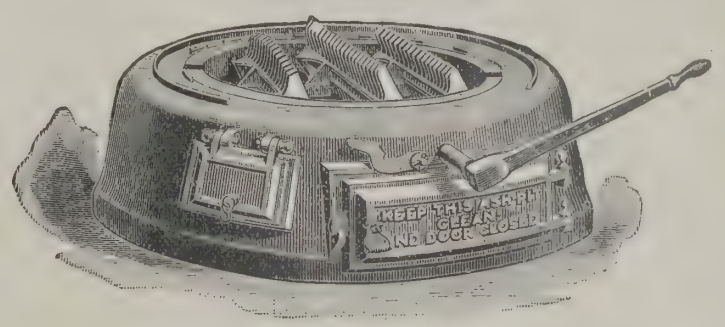
CORRESPONDENCE SOLICITED.

This is the Grate now used in the Celebrated

"EQUATOR" (STEAM) and "GULF STREAM" (HOT WATER) HOUSE HEATERS

THE MOST MODERN AND EFFICIENT HIGH GRADE HEATERS NOW IN THE FIELD.

Let us send you our Illustrated Boiler Book, containing Treatise on Steam and Water Warming, and th Selection of an Apparatus.

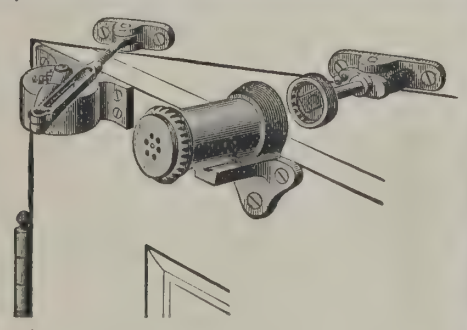


OUR 1895 GRATE.

NASON MANUFACTURING COMPANY,

71 Beekman Street, New York City

You are not ready



for cold weather if your purchases have not included something to keep doors closed, shutting the cold out and the warm in. For closing doors and keeping them closed when desired nothing equals the ECLIPSE CHECK and SPRING. The Spring acts promptly and effectively closes the door. The Check prevents the slamming, destruction of glass and jarring of the house. It is a simple and durable device; easily applied and easily kept in order.

At all seasons of the year

there is use for such a device on other than the outside doors. The odors of the kitchen-cooking should be kept from the other parts of the house. The Eclipse applied to the kitchen door will do it. Made by Sargent and Company, New York, and New Haven, Conn.

For Sale at Hardware Stores the World over.

"Now We Have It." . . . .

THE DUNNING CLUB . .

A Strictly WROUGHT IRON or STEEL BOILER for STEAM and HOT WATER HEATING at "CAST IRON" PRICES.

Write us for Price List. We will surprise you

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IMPERIAL BRAND PREPARED ROOFINGS.

BEST QUALITY. **BUILDING PAPERS.** EASILY APPLIED.

Rosin-Sized and Waterproof Sheathings,
Parchment Building Paper,
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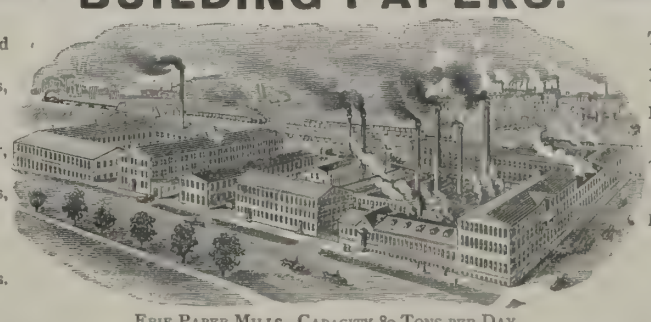

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Asbestos Sheathing and Building Felts, Asbestos Steam Packing,

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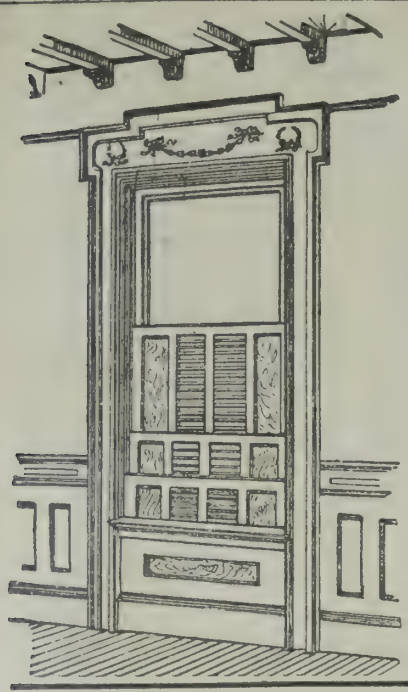


The PHŒNIX
Inside Sliding BLINDS

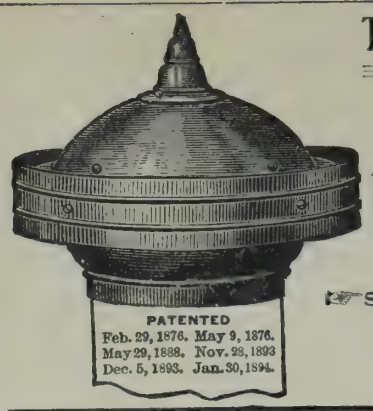
HAVE several late and valuable features covered by patents; notably, the Springs and Corrugated Slat Rod.

Panels veneered on **COMPRESSED WOOD PULP**, or made solid. They are perfect in workmanship and made of the best material.

Our **SLIDING BLIND** is so far in advance of any old style that no comparison can be made. No building, public or private, is complete without them. We invite inquiry as to their comfort, convenience and economy.

We challenge competition on our **VENEERED HARD-WOOD DOORS.** Our reference, the whole country; our work is used everywhere

PHŒNIX SLIDING BLIND CO.,
PHŒNIX, N. Y.



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FOR PERFECTLY VENTILATING
Churches, Schools, Factories, Hospitals.

Will render upper floors comfortable and habitable, and remove sewer gas from your residence.

SMOKY CHIMNEYS CURED.

☞SEND FOR PAMPHLET ON VENTILATION.

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Warranted equal to any, and superior to most, of the Foreign Brands.

Official Tests Nos. 3567 and 3568, made by the Department of Docks, New York, March 31, 1894, being part of contract No. 464 for 8,000 barrels.

TENSILE STRENGTH, 7 days, neat cement .....622 lbs.
" " 7 days, 2 parts sand to 1 of cement .....332 lbs.
Pats steamed and boiled, ... Satisfactory.

All our product is of the first quality, and is the only American Portland Cement that meets the requirements of the U. S. Government and the New York Department of Docks. We make no second grade or so-called improved cement.

ATLAS CEMENT CO., 143 LIBERTY STREET, NEW YORK CITY.

S. B. SEXTON & SON,

ESTABLISHED 1839,

Original Patentees, Inventors, and Manufacturers of the

Baltimore Fireplace Heaters,

Also Manufacturers of the best STOVES, RANGES, and FURNACES.

Send for Testimonial book, and be convinced.

Sexton's Grand Heater.
The original and most perfect fireplace heater ever made; so acknowledged by the trade and public.

S. B. SEXTON & SON,
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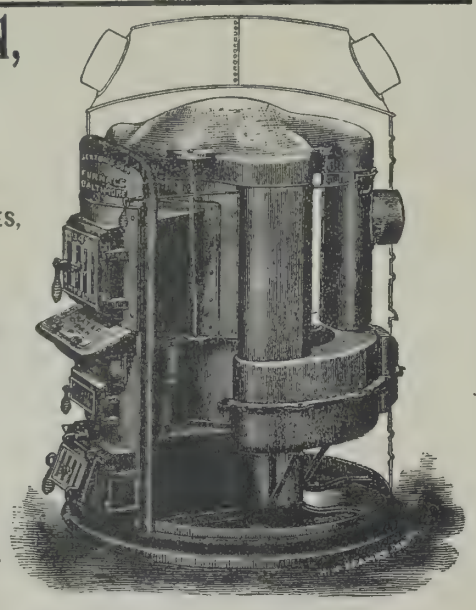
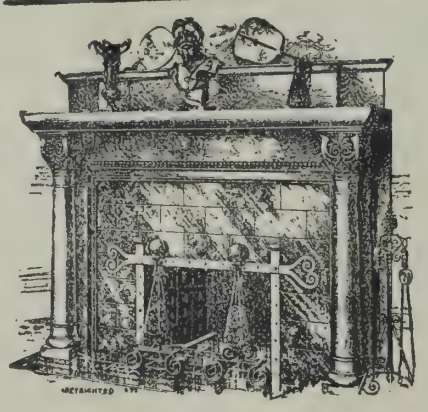


Sexton's Improved Low Down Radiating Furnace.
Large radiating surface; perfect combustion; economical in use of fuel; portable and brick-set.



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With Tiles, Grates, Andirons, etc., to match.
If you are building, write us for designs and prices.
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WOODEN TANKS FOR HOUSE WATER-SERVICE
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THE MAXIMUM RESULTS, WITH A MINIMUM EXPENSE.

A successful record of over 12 years has placed this roofing pre-eminently in the front rank. Suitable alike for steep or flat roofs, with a complete adaptability for the most exacting structural requirements. Manufactured only by

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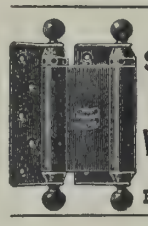

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THEY ARE MADE OF
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Put up ready for use in cans of convenient size, with directions.

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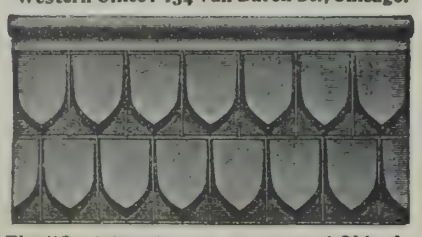

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SLATE Makes the Very Best Roofing Material. . .

It's just as cheap as Shingles, and a hundred times better. It's cheaper than Tin, Iron or Tile, and lasts ten times as long. We furnish

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NATURAL SLATE BLACKBOARDS.
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